

SAF-RC-236
100N Groundwater Sample
Collection Supporting UPR-100-N-17
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 7/8/14
INITIAL/DATE

COMMENTS:

SDG X0058

SAF-RC-236

Rad only

☒ Chem only

Rad & Chem

☒ Complete

Partial

Sample Location: 199-N-19, 199-N-3, 199-N-56,



July 07, 2014

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354

Re: RC-236A Groundwater
Work Order: 350978
SDG: X0058

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 19, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1616.

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-236A-103
Enclosures



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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0058
Work Order: 350978**

July 07, 2014

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on June 19, 2014 for analysis.

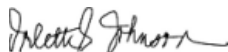
Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
350978001	B2WVT9
350978002	B2WVV0
350978003	B2WVV2
350978004	B2WVV3
350978005	B2WVV5
350978006	B2WVV6

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Diesel Range Organics, GC Volatiles (GRO), GC/MS Volatile, General Chemistry, HPLC Polynuclear Aromatic Hydrocarbon and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

RC-236A-103

Page 1 of 1

Collector
D.W. Brotherton
CHPRC

Contact/Requester
THOMPSON, WS

Telephone No. 372-9597

SAF No. RC-236A

Sampling Origin
199-N-19

Purchase Order/Charge Code
303382ES20

Project Title
100-N Groundwater Sample Collection S

Logbook No. HNF-N-506

Ice Chest No. 605-353

Shipped To (Lab)
GEL Laboratories, LLC

Method of Shipment
Commercial Carrier

Bill of Lading/Air Bill No. 770345930305

Protocol
CHARACTERIZATION

Priority: 15 Days

PRIORITY

Offsite Property No. 4875

POSSIBLE SAMPLE HAZARDS/REMARKS

SPECIAL INSTRUCTIONS

Hold Time

Total Activity Exemption: Yes ☒ No ☐

*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.

** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.

B2WVT9	N	W	6-17-14	1434	2x1-L G	1664A_OILGREASE: COMMON	28 Days	HC to pH <2/Cool~4C
B2WVT9	N	W			1x1-L aG	WTPH_DIESEL: COMMON; WTPH_MOTOR OIL: COMMON	14/40 Days	HC to pH <2/Cool~4C
B2WVT9	N	W			4x40-mL aGs*	WTPH_GASOLINE: COMMON	14 Days	HC to pH <2/Cool~4C
B2WVT9	N	W			1x500-mL G/P	6010_METALS_ICP (Supertrace): COMMON; 6010_METALS_ICP (Supertrace): COMMON (Add-on)	6 Months	HNO3 to pH <2
B2WVT9	N	W			1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool~4C
B2WVT9	N	W			2x1-L aG	8310_PAHs: COMMON	7/40 Days	Cool~4C
B2WVT9	N	W	6-17-14	1434	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool~4C

Relinquished By D.W. Brotherton CHPRC	Print DwBroth	Sign	Received By SSU-1	Print SSU-1	Sign	Date/Time JUN 17 2014 1530	Matrix *
Relinquished By SSU-1	Print	Sign	Received By K.M. Campbell CHPRC	Print K.M. Campbell	Sign	Date/Time JUN 18 2014 1010	Matrix *
Relinquished By K.M. Campbell CHPRC	Print K.M. Campbell	Sign	Received By PEDEX	Print PEDEX	Sign	Date/Time JUN 18 2014 1400	Matrix *
Relinquished By	Print	Sign	Received By H. Taylor	Print H. Taylor	Sign	Date/Time JUN 19 2014 0850	Matrix *
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)						Date/Time

PRINTED O 5/20/2014

A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. # RC-236A-104	
D.W. Brotherton CHPRC				Contact/Requester	THOMPSON, WS		Telephone No.	372-9597	
SAF No. RC-236A				Sampling Origin	199-N-19		Purchase Order/Charge Code	303382ES20	
Project Title 100-N Groundwater Sample Collection S				Logbook No.	HNF-N-506 66124		Ice Chest No.	6W5-353	
Shipped To (Lab) GEL Laboratories, LLC				Method of Shipment	Commercial Carrier		Bill of Lading/Air Bill No.	7703 45930305	
Protocol CHARACTERIZATION				Priority:	15 Days		Offsite Property No.	4875	
POSSIBLE SAMPLE HAZARDS/REMARKS				SPECIAL INSTRUCTIONS		Hold Time		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.				** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.					
				** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.					
B2WVV0	N	W	6-17-14 1434	1x250-mL G/P	9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on)	28 Days/48 Hours	Cool-4C		

Relinquished By D.W. Brotherton CHPRC	Print 	Sign 	Date/Time JUN 17 2014 1530	Received By SSU-1	Print 	Sign 	Date/Time JUN 17 2014 1530	Matrix * DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By SSU-1	Print 	Sign 	Date/Time JUN 18 2014 1010	Received By K.M. Campbell CHPRC	Print 	Sign 	Date/Time JUN 18 2014 1010	
Relinquished By K.M. Campbell CHPRC	Print 	Sign 	Date/Time JUN 18 2014 1400	Received By FEDEX	Print 	Sign 	Date/Time JUN 18 2014 1010	
Relinquished By	Print 	Sign 	Date/Time JUN 18 2014 1400	Received By H. Taylor	Print 	Sign 	Date/Time JUN 18 2014 0850	
FINAL SAMPLE DISPOSITION				Disposal Method (e.g., Return to customer, per lab procedure, used in process)				Date/Time

PRINTED O 5/20/2014 A-6004-842 (REV 2)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

RC-236A-105

Page 1 of 1

Collector	D.W. Brotherton CHPRC	Contact/Requester	THOMPSON, WS	Telephone No.	372-9597
SAF No.	RC-236A	Sampling Origin	199-N-3	Purchase Order/Charge Code	303382ES20
Project Title	100-N Groundwater Sample Collection S	Logbook No.	HNF-N-506 66/124	Ice Chest No.	605-319
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	7703 45930073
Protocol	CHARACTERIZATION	Priority:	15 Days	Offsite Property No.	4875

POSSIBLE SAMPLE HAZARDS/REMARKS

*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL INSTRUCTIONS

** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.

** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.

Hold Time

Total Activity Exemption: Yes ☒ No ☐

B2WVV2	N	W	6-17-14	1218	2x1-LG	1664A_OILGREASE: COMMON	28 Days	HCl to pH <2/Cool~4C
B2WVV2	N	W			1x1-L aG	WTPH_DIESEL: COMMON; WTPH_MOTOR OIL: COMMON	14/40 Days	HCl to pH <2/Cool~4C
B2WVV2	N	W			4x40-mL aGs*	WTPH_GASOLINE: COMMON	14 Days	HCl to pH <2/Cool~4C
B2WVV2	N	W			1x500-mL G/P	6010_METALS_ICP (Supertrace): COMMON; 6010_METALS_ICP (Supertrace): COMMON (Add-on)	6 Months	HNO3 to pH <2
B2WVV2	N	W			1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool~4C
B2WVV2	N	W			2x1-L aG	8310_PAHs: COMMON	7/40 Days	Cool~4C
B2WVV2	N	W	6-17-14	1218	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool~4C

Relinquished By	D.W. Brotherton CHPRC	Print	Signature	Date/Time	Received By	SSU-1	Print	Signature	Date/Time
Relinquished By	SSU-1	Print	Signature	Date/Time	Received By	K.M. Campbell CHPRC	Print	Signature	Date/Time
Relinquished By	K.M. Campbell CHPRC	Print	Signature	Date/Time	Received By	FEDEX	Print	Signature	Date/Time
Relinquished By		Print	Signature	Date/Time	Received By	H. Taylor	Print	Signature	Date/Time
FINAL SAMPLE DISPOSITION					Disposal Method (e.g., Return to customer, per lab procedure, used in process)				

S	=	Soil	DS	=	Drum Solids
SE	=	Sediment	DL	=	Drum Liquids
SO	=	Solid	T	=	Tissue
SL	=	Sludge	WI	=	Wipe
W	=	Water	L	=	Liquid
O	=	Oil	V	=	Vegetation
A	=	Air	X	=	Other

**CH2MHill Plateau Remediation
Company**

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.#

RC-236A-106

Page 1 of 1

Collector D.W. Brotherton CHPRC	Contact/Requester THOMPSON, WS	Telephone No. 372-9597
SAF No. RC-236A	Sampling Origin 199-N-3	Purchase Order/Charge Code 303382ES20
Project Title 100-N Groundwater Sample Collection S	Logbook No. HNF-N-506	Ice Chest No. 6WS-319
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 770345930073
Protocol CHARACTERIZATION	Priority: 15 Days	Offsite Property No. 4875
POSSIBLE SAMPLE HAZARDS/REMARKS		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.		** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.
		** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.

B2WV3	N	W	6-17-14	1218	1x250-mL G/P	9056 ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on)	28 Days/48 Hours	Cool~4C
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Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
D.W. Brotherton CHPRC	<i>Dw Brotherton</i>		JUN 17 2014 1530	KM Campbell CHPRC	SSU-1		JUN 17 2014 1530	S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquids SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
SSU-1			JUN 18 2014 1010	KM Campbell CHPRC			JUN 18 2014 1010	
KM Campbell CHPRC	<i>KM Campbell</i>		JUN 18 2014 1400	FEDEX				
Relinquished By			Date/Time	Received By			Date/Time	
			Fedex	H Taylor			JUN 19 2014 0850	
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, used in process)						Disposed By	Date/Time

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #
RC-236A-107
Page 1 of 1

Collector D.W. Brotherton CHPRC	Contact/Requester THOMPSON, WS	Telephone No. 372-9597
SAF No. RC-236A	Sampling Origin 199-N-56	Purchase Order/Charge Code 303382ES20
Project Title 100-N Groundwater Sample Collection S	Logbook No. HNF-N-506 66/24	Ice Chest No. 645-319
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 770345930073
Protocol CHARACTERIZATION	Priority: 15 Days	Offsite Property No. 4875

POSSIBLE SAMPLE HAZARDS/REMARKS

*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☒ No ☐

** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.

** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.

B2WVV5	N	W	6-17-14 1336	2x1-L G	1664A_OILGREASE: COMMON	28 Days	HCl to pH <2/Cool~4C
B2WVV5	N	W		1x1-L aG	WTPH_DIESEL: COMMON; WTPH_MOTOR OIL: COMMON	14/40 Days	HCl to pH <2/Cool~4C
B2WVV5	N	W		4x40-mL aGs*	WTPH_GASOLINE: COMMON	14 Days	HCl to pH <2/Cool~4C
B2WVV5	N	W		1x500-mL G/P	6010_METALS_ICP (Supertrace): COMMON; 6010_METALS_ICP (Supertrace): COMMON (Add-on)	6 Months	HNO3 to pH <2
B2WVV5	N	W		1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool~4C
B2WVV5	N	W		2x1-L aG	8310_PAHs: COMMON	7/40 Days	Cool~4C
B2WVV5	N	W	6-17-14 1336	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool~4C

Relinquished By D.W. Brotherton CHPRC	Print <i>[Signature]</i>	Date/Time JUN 17 2014 1530	Received By SSU-1	Print SSU-1	Sign <i>[Signature]</i>	Date/Time JUN 17 2014 1530	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By SSU-1		Date/Time JUN 18 2014 1010	Received By K.M. Campbell CHPRC			Date/Time JUN 18 2014 1010	
Relinquished By K.M. Campbell CHPRC		Date/Time JUN 18 2014 1400	Received By FEDEX			Date/Time JUN 18 2014 1400	
Relinquished By		Date/Time Fedex	Received By H. Taylor			Date/Time 06/14/14 0850	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By <i>[Signature]</i>		Date/Time	

CH2MHill Plateau Remediation Company				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. # RC-236A-108	
Collector D.W. Brotherton CHPRC				Contact/Requester THOMPSON, WS		Telephone No. 372-9597		Page 1 of 1	
SAF No. RC-236A				Sampling Origin 199-N-56		Purchase Order/Charge Code 303382ES20			
Project Title 100-N Groundwater Sample Collection S				Logbook No. HNF-N-506 66124		Ice Chest No. 6WS-319			
Shipped To (Lab) GEL Laboratories, LLC				Method of Shipment Commercial Carrier		Bill of Lading/Air Bill No. 770345930073			
Protocol CHARACTERIZATION				Priority: 15 Days		Offsite Property No. 4875			
POSSIBLE SAMPLE HAZARDS/REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.				SPECIAL INSTRUCTIONS HOLD TIME ** The field NCOs prior to purging the well for sample collection, will use a transparent bailer to collect a grab sample to evaluate the presence of an oil sheen. They are to record their observations, along with any odors observed on the Field Sampling Report provided.		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
				** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.					
B2WVV6		N	W	6-17-14	1336	1x250-mL G/P	9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on)	28 Days/48 Hours	Cool-4C

Relinquished By D.W. Brotherton CHPRC	Print DWB	Sign 	Date/Time JUN 17 2014 1530	Received By K.M. Campbell CHPRC	Print SSU-1	Sign 	Date/Time JUN 17 2014 1530	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By SSU-1			Date/Time JUN 18 2014 1010	Received By K.M. Campbell CHPRC			Date/Time JUN 18 2014 1010	
Relinquished By K.M. Campbell CHPRC			Date/Time JUN 18 2014 1400	Received By FEDEX			Date/Time JUN 18 2014 1400	
Relinquished By			Date/Time Fedex	Received By H. Taylor			Date/Time 061914 0850	
FINAL SAMPLE DISPOSITION				Disposal Method (e.g., Return to customer, used in process)				Date/Time
PRINTED O 5/20/2014				A-6004-842 (REV 2)				

SAMPLE RECEIPT & REVIEW FORM

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>350978</u>	
Received By: <u>H. Taylor</u>		Date Received: <u>06/19/14</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Preservation Method: Ice bags Blue ice Dry ice None Other (describe) <u>2</u> *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Temperature Device Serial #: <u>130462961</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
14	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7703 4593 0073</u> <u>7703 4739 2435-2</u> <u>0305</u> <u>2104</u> <u>12</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 07 July 2014

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122014-12
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Volatile Analysis

Case Narrative

**ChemStation Case Narrative
WC-HANFORD, INC. (WCHN)
SDG X0058**

Method/Analysis Information

Procedure: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Batch Number: 1398733

Sample Analysis

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203116130	Method Blank (MB)
1203116133	Laboratory Control Sample (LCS)
1203116141	350978001(B2WVT9) Post Spike (PS)
1203116142	350978001(B2WVT9) Post Spike Duplicate (PSD)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The samples in this SDG were analyzed on an "as received" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 21.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 19.1.2. False positive analytes are designated on the quantitation report with a 'd' qualifier.

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package.

The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were

added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Blank (MB) Statement

The blank analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350978001 (B2WVT9) was designated for spike analysis.

Matrix Spike (PS) Recovery Statement

The spike 1203116141 (B2WVT9) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Matrix Spike Duplicate (PSD) Recovery Statement

The spike duplicate 1203116142 (B2WVT9) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Relative Percent Difference (RPD) Statement

The RPDs between the matrix spike pair met the acceptance limits.

Internal Standard (ISTD) Acceptance

The internal standard responses in all client and quality control samples met the required acceptance criteria.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Sample Preservation and Integrity

Preservation was indicated on the vials, however the pH of several samples was above 2 at the time of analysis. For samples 350859001 and 350859003, two vials of each sample were pulled and all vials were pH 7. The following samples were also above pH2: 350978001 (B2WVT9), 350978003 (B2WVV2) and 350978005 (B2WVV5).

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-analyses were not required for samples in this SDG.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

The following DERs were generated for this SDG: 1309643. 1203116141 (B2WVT9), 1203116142 (B2WVT9) and All.

Manual Integrations

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

TIC Comment

Tentatively identified compounds (TIC) were requested for this sample delivery group/work order. Please note that non-requested target analytes that are reported on the quantitation reports will be present on the Form I. These detected analytes are included in the calibrated method and as a result will be reported on the Sample Data Summary (Form I) or Certificate of Analysis (C of A). TIC data are included on the Sample Data Summary (Form I).

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

Residual Chlorine was not detected in any of the samples in this SDG.

System Configuration

The Volatile-GC/MS analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA3.I	Agilent 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT			
Mo.Day Yr. 30-JUN-14	Division: Federal	Quality Criteria: SOP	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: WCHN001
Batch ID: 1398733	Sample Numbers: all		
Potentially affected work order(s)(SDG): 350859(X0057),350978(X0058) Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. The recoveries for Acetone and 2-Butanone were outside of acceptance limits in the MS and in the MSD performed on sample 350859005. The calculated relative percent differences between the MS and MSD were within the acceptance limits for both compounds. 2. The recoveries for Acetone and 2-Butanone were outside of acceptance limits in the MS and in the MSD performed on sample 350978001. The calculated relative percent differences between the MS and MSD were within the acceptance limits for both compounds.		1,2. Narrate and report data.	

Originator's Name:

Crystal Stacey 30-JUN-14

Data Validator/Group Leader:

Erin Haubert 02-JUL-14

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

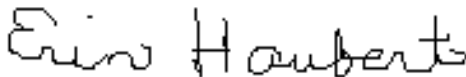
The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 02 JUL 2014

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: **RC-236A Groundwater**

Report Date: July 2, 2014

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Volatile Organics

Volatiles by SW846 8260C "As Received"

1,1,1-Trichloroethane	U	0.300	0.300	5.00	ug/L	1	CDS1	06/26/14	0057	1398733	1
1,1,2-Trichloroethane	U	0.300	0.300	5.00	ug/L	1					
1,1-Dichloroethane	U	0.300	0.300	10.0	ug/L	1					
1,1-Dichloroethylene	U	0.300	0.300	10.0	ug/L	1					
1,2-Dichloroethane	U	0.300	0.300	5.00	ug/L	1					
2-Butanone	TU	3.00	3.00	10.0	ug/L	1					
4-Methyl-2-pentanone	U	3.00	3.00	10.0	ug/L	1					
Acetone	TU	3.00	3.00	20.0	ug/L	1					
Benzene	U	0.300	0.300	5.00	ug/L	1					
Carbon disulfide	U	1.60	1.60	10.0	ug/L	1					
Carbon tetrachloride	U	0.300	0.300	5.00	ug/L	1					
Chlorobenzene	U	0.300	0.300	5.00	ug/L	1					
Chloroform	J	1.61	0.300	5.00	ug/L	1					
Ethylbenzene	U	0.300	0.300	5.00	ug/L	1					
Methylene chloride	U	1.60	1.60	5.00	ug/L	1					
Tetrachloroethylene	U	0.300	0.300	5.00	ug/L	1					
Toluene	U	0.300	0.300	5.00	ug/L	1					
Trichloroethylene	U	0.300	0.300	5.00	ug/L	1					
Vinyl chloride	U	0.300	0.300	10.0	ug/L	1					
Xylenes (total)	U	0.300	0.300	10.0	ug/L	1					

<i>Surrogate/Tracer recovery</i>	<i>Result</i>	<i>Nominal</i>	<i>Recovery%</i>	<i>Acceptable Limits</i>	<i>Date Time:</i>	<i>06/26/14 00 57</i>
Bromofluorobenzene	42.5 ug/L	50.0	84.9	(80%-120%)		
Toluene-d8	46.6 ug/L	50.0	93.2	(80%-120%)		
1,2-Dichloroethane-d4	47.0 ug/L	50.0	93.9	(78%-124%)		

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/26/14 00 57</i>
unknown siloxane		11.692	7.06 ug/L	0	J		

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260C	

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Certificate of Analysis

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: **RC-236A Groundwater**

Report Date: July 2, 2014

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Volatile Organics

Volatiles by SW846 8260C "As Received"

1,1,1-Trichloroethane	U	0.300	0.300	5.00	ug/L	1	CDS1	06/26/14	0128	1398733	1
1,1,2-Trichloroethane	U	0.300	0.300	5.00	ug/L	1					
1,1-Dichloroethane	U	0.300	0.300	10.0	ug/L	1					
1,1-Dichloroethylene	U	0.300	0.300	10.0	ug/L	1					
1,2-Dichloroethane	U	0.300	0.300	5.00	ug/L	1					
2-Butanone	TU	3.00	3.00	10.0	ug/L	1					
4-Methyl-2-pentanone	U	3.00	3.00	10.0	ug/L	1					
Acetone	TU	3.00	3.00	20.0	ug/L	1					
Benzene	U	0.300	0.300	5.00	ug/L	1					
Carbon disulfide	U	1.60	1.60	10.0	ug/L	1					
Carbon tetrachloride	U	0.300	0.300	5.00	ug/L	1					
Chlorobenzene	U	0.300	0.300	5.00	ug/L	1					
Chloroform	J	1.04	0.300	5.00	ug/L	1					
Ethylbenzene	U	0.300	0.300	5.00	ug/L	1					
Methylene chloride	U	1.60	1.60	5.00	ug/L	1					
Tetrachloroethylene	J	0.380	0.300	5.00	ug/L	1					
Toluene	U	0.300	0.300	5.00	ug/L	1					
Trichloroethylene	U	0.300	0.300	5.00	ug/L	1					
Vinyl chloride	U	0.300	0.300	10.0	ug/L	1					
Xylenes (total)	U	0.300	0.300	10.0	ug/L	1					

<i>Surrogate/Tracer recovery</i>	<i>Result</i>	<i>Nominal</i>	<i>Recovery%</i>	<i>Acceptable Limits</i>	<i>Date Time:</i>	<i>06/26/14 01 28</i>
Bromofluorobenzene	43.6 ug/L	50.0	87.1	(80%-120%)		
Toluene-d8	48.1 ug/L	50.0	96.1	(80%-120%)		
1,2-Dichloroethane-d4	49.5 ug/L	50.0	98.9	(78%-124%)		

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/26/14 01 28</i>
unknown		4.521	5.42 ug/L	0	J		

The following Analytical Methods were performed

Method	Description	Analyst	Comments
1	SW846 8260C		

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: **RC-236A Groundwater**

Report Date: July 2, 2014

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Volatile Organics

Volatiles by SW846 8260C "As Received"

1,1,1-Trichloroethane	U	0.300	0.300	5.00	ug/L	1	CDS1	06/26/14	0158	1398733	1
1,1,2-Trichloroethane	U	0.300	0.300	5.00	ug/L	1					
1,1-Dichloroethane	U	0.300	0.300	10.0	ug/L	1					
1,1-Dichloroethylene	U	0.300	0.300	10.0	ug/L	1					
1,2-Dichloroethane	U	0.300	0.300	5.00	ug/L	1					
2-Butanone	TU	3.00	3.00	10.0	ug/L	1					
4-Methyl-2-pentanone	U	3.00	3.00	10.0	ug/L	1					
Acetone	TU	3.00	3.00	20.0	ug/L	1					
Benzene	U	0.300	0.300	5.00	ug/L	1					
Carbon disulfide	U	1.60	1.60	10.0	ug/L	1					
Carbon tetrachloride	U	0.300	0.300	5.00	ug/L	1					
Chlorobenzene	U	0.300	0.300	5.00	ug/L	1					
Chloroform	J	0.800	0.300	5.00	ug/L	1					
Ethylbenzene	U	0.300	0.300	5.00	ug/L	1					
Methylene chloride	U	1.60	1.60	5.00	ug/L	1					
Tetrachloroethylene	U	0.300	0.300	5.00	ug/L	1					
Toluene	U	0.300	0.300	5.00	ug/L	1					
Trichloroethylene	U	0.300	0.300	5.00	ug/L	1					
Vinyl chloride	U	0.300	0.300	10.0	ug/L	1					
Xylenes (total)	U	0.300	0.300	10.0	ug/L	1					

<i>Surrogate/Tracer recovery</i>	<i>Result</i>	<i>Nominal</i>	<i>Recovery%</i>	<i>Acceptable Limits</i>	<i>Date Time:</i>	<i>06/26/14 01 58</i>
Bromofluorobenzene	43.5 ug/L	50.0	87.0	(80%-120%)		
Toluene-d8	48.7 ug/L	50.0	97.5	(80%-120%)		
1,2-Dichloroethane-d4	49.5 ug/L	50.0	99.1	(78%-124%)		

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/26/14 01 58</i>
unknown		4.521	6.71 ug/L	0	J		
unknown siloxane		11.692	9.2 ug/L	0	J		

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260C	

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 2, 2014

Page 1 of 6

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1398733										
QC1203116133	LCS										
1,1,1-Trichloroethane	50.0			54.4	ug/L		109	(70%-130%)	CDS1	06/25/14	19:54
1,1,2-Trichloroethane	50.0			46.8	ug/L		93.6	(70%-130%)			
1,1-Dichloroethane	50.0			50.4	ug/L		101	(70%-130%)			
1,1-Dichloroethylene	50.0			52.1	ug/L		104	(70%-130%)			
1,2-Dichloroethane	50.0			48.4	ug/L		96.9	(70%-130%)			
2-Butanone	250			199	ug/L		79.5	(70%-130%)			
4-Methyl-2-pentanone	250			202	ug/L		80.6	(70%-130%)			
Acetone	250			207	ug/L		83	(70%-130%)			
Benzene	50.0			49.3	ug/L		98.5	(70%-130%)			
Carbon disulfide	250			255	ug/L		102	(70%-130%)			
Carbon tetrachloride	50.0			54.8	ug/L		110	(70%-130%)			
Chlorobenzene	50.0			49.7	ug/L		99.4	(70%-130%)			
Chloroform	50.0			50.2	ug/L		100	(70%-130%)			
Ethylbenzene	50.0			48.7	ug/L		97.3	(70%-130%)			
Methylene chloride	50.0			42.9	ug/L		85.8	(70%-130%)			
Tetrachloroethylene	50.0			51.4	ug/L		103	(70%-130%)			
Toluene	50.0			51.6	ug/L		103	(70%-130%)			
Trichloroethylene	50.0			53.8	ug/L		108	(70%-130%)			
Vinyl chloride	50.0			44.8	ug/L		89.6	(70%-130%)			
Xylenes (total)	150			147	ug/L		98.1	(70%-130%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1398733										
**1,2-Dichloroethane-d4	50.0			47.3	ug/L		94.6	(78%-124%)	CDS1	06/25/14	19:54
**Bromofluorobenzene	50.0			47.9	ug/L		95.8	(80%-120%)			
**Toluene-d8	50.0			48.2	ug/L		96.3	(80%-120%)			
QC1203116130 MB											
1,1,1-Trichloroethane			U	0.300	ug/L					06/25/14	20:54
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						

GEL LABORATORIES LLC

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1398733										
Vinyl chloride			U	0.300	ug/L				CDS1	06/25/14	20:54
Xylenes (total)			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			50.1	ug/L		100	(78%-124%)			
**Bromofluorobenzene	50.0			44.8	ug/L		89.7	(80%-120%)			
**Toluene-d8	50.0			48.7	ug/L		97.3	(80%-120%)			
QC1203116141 350978001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	43.4	ug/L		86.8	(70%-130%)		06/26/14	03:30
1,1,2-Trichloroethane	50.0	U	0.00	40.9	ug/L		81.8	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	40.7	ug/L		81.4	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	41.9	ug/L		83.7	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	41.8	ug/L		83.6	(70%-130%)			
2-Butanone	250	TU	0.00 T	126	ug/L		50.3 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	186	ug/L		74.4	(70%-130%)			
Acetone	250	TU	0.00 T	87.4	ug/L		35 *	(70%-130%)			
Benzene	50.0	U	0.00	41.7	ug/L		83.3	(70%-130%)			
Carbon disulfide	250	U	0.00	207	ug/L		83	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	44.0	ug/L		88	(70%-130%)			
Chlorobenzene	50.0	U	0.00	40.9	ug/L		81.7	(70%-130%)			
Chloroform	50.0	J	1.61	43.2	ug/L		83.3	(70%-130%)			
Ethylbenzene	50.0	U	0.00	40.9	ug/L		81.9	(70%-130%)			
Methylene chloride	50.0	U	0.00	37.5	ug/L		75.1	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	41.7	ug/L		83.3	(70%-130%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1398733										
Toluene	50.0	U	0.00	41.5	ug/L		82.9	(70%-130%)	CDS1	06/26/14	03:30
Trichloroethylene	50.0	U	0.00	43.1	ug/L		86.2	(70%-130%)			
Vinyl chloride	50.0	U	0.00	43.5	ug/L		87	(70%-130%)			
Xylenes (total)	150	U	0.00	119	ug/L		79.3	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		47.0	45.8	ug/L		91.6	(78%-124%)			
**Bromofluorobenzene	50.0		42.5	46.3	ug/L		92.7	(80%-120%)			
**Toluene-d8	50.0		46.6	46.2	ug/L		92.4	(80%-120%)			
QC1203116142 350978001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	51.4	ug/L	16.9	103	(0%-20%)		06/26/14	04:00
1,1,2-Trichloroethane	50.0	U	0.00	41.8	ug/L	2.01	83.5	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	46.0	ug/L	12.3	92	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	48.9	ug/L	15.5	97.8	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	45.4	ug/L	8.17	90.7	(0%-20%)			
2-Butanone	250	TU	0.00	T	144	ug/L	13.3	57.4*	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		195	ug/L	4.89	78.2	(0%-20%)		
Acetone	250	TU	0.00	T	104	ug/L	16.9	41.4*	(0%-20%)		
Benzene	50.0	U	0.00	47.1	ug/L	12.2	94.1	(0%-20%)			
Carbon disulfide	250	U	0.00	242	ug/L	15.6	96.9	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	51.9	ug/L	16.5	104	(0%-20%)			
Chlorobenzene	50.0	U	0.00	43.1	ug/L	5.24	86.1	(0%-20%)			
Chloroform	50.0	J	1.61	48.4	ug/L	11.3	93.6	(0%-20%)			
Ethylbenzene	50.0	U	0.00	43.0	ug/L	4.91	86	(0%-20%)			

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1398733										
Methylene chloride	50.0	U	0.00	41.4	ug/L	9.83	82.8	(0%-20%)	CDS1	06/26/14	04:00
Tetrachloroethylene	50.0	U	0.00	45.4	ug/L	8.46	90.7	(0%-20%)			
Toluene	50.0	U	0.00	43.8	ug/L	5.56	87.7	(0%-20%)			
Trichloroethylene	50.0	U	0.00	47.9	ug/L	10.4	95.7	(0%-20%)			
Vinyl chloride	50.0	U	0.00	45.3	ug/L	3.97	90.5	(0%-20%)			
Xylenes (total)	150	U	0.00	127	ug/L	6.59	84.7	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		47.0	47.2	ug/L		94.3	(78%-124%)			
**Bromofluorobenzene	50.0		42.5	46.8	ug/L		93.6	(80%-120%)			
**Toluene-d8	50.0		46.6	44.9	ug/L		89.8	(80%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

HPLC Polynuclear Aromatic Hydrocarbon Analysis

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG X0058**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons

Analytical Method: SW846 8310

Prep Method: SW846 3510C

Analytical Batch Number: 1397785

Prep Batch Number: 1397784

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8310:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203113779	Method Blank (MB)
1203113780	Laboratory Control Sample (LCS)
1203113783	350978003(B2WVV2) Matrix Spike (MS)
1203113784	350978003(B2WVV2) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-030 REV# 15.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.0.

Calibration Information

Due to software limitations, the files displayed at the beginning of the Form 6 are only the last files uploaded for each individual level. A complete listing of all files used in the current ICAL are shown on the Calibration History that is included with each Level 4 or higher package. The last file by date in each level is the one currently uploaded for that level.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 350978003 (B2WVV2) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

Biased high RPD values were observed in the MS/MSD pair (1203113783/1203113784) analyzed with sample 350978003 (B2WVV2). Please see the Form 3 in the data package for a complete list of RPD recoveries and acceptance limits. The biased high RPD recoveries were the result of lower, but passing recoveries observed in the MS (1203113783). The data are reported with the appropriate DER.

Technical Information:

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information:

Data Exception (DER) Documentation

Data Exception Report 1309921 was generated for this SDG.

Biased high RPD values were observed in the MS/MSD pair (1203113783/1203113784) analyzed with sample 350978003 (B2WVV2). Please see the Form 3 in the data package for a complete list of RPD recoveries and acceptance limits. The biased high RPD recoveries were the result of lower, but passing recoveries observed in the MS (1203113783). The data are reported with the appropriate DER.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may have required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments

The Form 8 is used only as a sequence of the analysis.

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for Polynuclear Aromatic Hydrocarbons analyses.

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100uL loop injector.

The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

The HPLC 1100 is also coupled to a HP Model G1321A Fluorescence Detector in series which monitors the following varying excitations and emissions 1) EX 230 nm EM 330 nm; 2) EX 210 nm EM 314 nm; 3) EX 250 nm EM 368 nm; 4) EX 237 nm EM 440 nm; 5) EX 277 nm EM 376 nm; 6) EX 255 nm EM 420 nm; 7) EX 230 nm EM 453 nm.

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

The HPLC system is identified with a designation of HPLC E in the raw data printouts.

Chromatographic Columns

Chromatographic separation of Polynuclear Aromatic Hydrocarbons is accomplished through analysis on the following reversed phase columns:

Phenomenex: Luna C18 (2), 100 A, 250 mm x 4.6 mm containing 5 um size particle.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT			
Mo.Day Yr. 30-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: HPLC	Test / Method: SW846 8310	Matrix Type: Liquid	Client Code: WCHN
Batch ID: 1397785	Sample Numbers: 1203113784		
Potentially affected work order(s)(SDG): 350978(X0058) Application Issues: Failed RPD for MS/MSD, or PS/PSD Failed Yield for Surrogates			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Biased high RPD values were observed in the MS/MSD pair (1203113783/1203113784) analyzed with sample 350978003 (B2WVV2). Please see the Form 3 in the data package for a complete list of RPD recoveries and acceptance limits.		1. The biased high RPD recoveries were the result of lower, but passing recoveries observed in the MS (1203113783). The data are reported with the appropriate DER.	

Originator's Name:

Charles Wilson 01-JUL-14

Data Validator/Group Leader:

Michael Penny 02-JUL-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

The Qualifiers in this report are defined as follows:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Michael Penny

Date: 02 JUL 2014

Title: Group Leader

Roadmap for WCHN X0058 HPLC_PAH

This roadmap was analyzed by cww on 07-01-2014, 10:38.

This roadmap was reviewed by map on 07-02-2014, 08:23.

This roadmap was packaged by on 07-02-2014, 10:08.

This roadmap was packaged by map on 07-02-2014, 11:05.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2519.d	350978001	25-JUN-2014	21:41	X0058.sub	B2WVT9	1	1397785	<input type="text"/>
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2520.d	350978003	25-JUN-2014	22:23	X0058.sub	B2WVV2	1	1397785	<input type="text"/>
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2523.d	350978005	26-JUN-2014	00:30	X0058.sub	B2WVV5	1	1397785	<input type="text"/>

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2504A.d	1203113779	mb	25-JUN-2014	11:09	X0058.sub	PAHBLK01	1	1397785	<input type="text"/>
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2505A.d	1203113780	lcs	25-JUN-2014	11:51	X0058.sub	PAHBLK01LCS	1	1397785	<input type="text" value="Pass"/>
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2521.d	1203113783	ms	25-JUN-2014	23:06	X0058.sub	B2WVV2MS	1	1397785	<input type="text" value="Pass"/>
<input type="checkbox"/>	N	/chem/hplce.i/p062514.b/ph5f2522.d	1203113784	msd	25-JUN-2014	23:48	X0058.sub	B2WVV2MSD	1	1397785	<input type="text" value="Pass"/>

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 2, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3510 PAH Extend list Liquid "As Received"											
Acenaphthene	U	0.144	0.144	0.481	ug/L	1	CWW	06/25/14	2141	1397785	1
Acenaphthylene	U	0.144	0.144	0.481	ug/L	1					
Anthracene	U	0.144	0.144	0.481	ug/L	1					
Benzo(a)anthracene	U	0.0154	0.0154	0.0481	ug/L	1					
Benzo(a)pyrene	U	0.0154	0.0154	0.0481	ug/L	1					
Benzo(b)fluoranthene	U	0.0154	0.0154	0.0481	ug/L	1					
Benzo(ghi)perylene	U	0.0154	0.0154	0.0481	ug/L	1					
Benzo(k)fluoranthene	U	0.00769	0.00769	0.024	ug/L	1					
Chrysene	U	0.0154	0.0154	0.0481	ug/L	1					
Dibenzo(a,h)anthracene	U	0.0154	0.0154	0.0481	ug/L	1					
Fluoranthene	U	0.0154	0.0154	0.0481	ug/L	1					
Fluorene	U	0.144	0.144	0.481	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	0.0154	0.0154	0.0481	ug/L	1					
Naphthalene	U	0.144	0.144	0.481	ug/L	1					
Phenanthrene	U	0.175	0.175	0.481	ug/L	1					
Pyrene	U	0.0154	0.0154	0.0481	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510 PAH BY HPLC Prep in liquid	RXC1	06/23/14	1045	1397784

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3510 PAH Extend list Liquid "As Received"	111 ug/L	240	46.2	(21%-96%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 2, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3510 PAH Extend list Liquid "As Received"											
Acenaphthene	U	0.134	0.134	0.446	ug/L	1	CWW	06/25/14	2223	1397785	1
Acenaphthylene	U	0.134	0.134	0.446	ug/L	1					
Anthracene	U	0.134	0.134	0.446	ug/L	1					
Benzo(a)anthracene	U	0.0143	0.0143	0.0446	ug/L	1					
Benzo(a)pyrene	U	0.0143	0.0143	0.0446	ug/L	1					
Benzo(b)fluoranthene	U	0.0143	0.0143	0.0446	ug/L	1					
Benzo(ghi)perylene	U	0.0143	0.0143	0.0446	ug/L	1					
Benzo(k)fluoranthene	U	0.00714	0.00714	0.0223	ug/L	1					
Chrysene	U	0.0143	0.0143	0.0446	ug/L	1					
Dibenzo(a,h)anthracene	U	0.0143	0.0143	0.0446	ug/L	1					
Fluoranthene	U	0.0143	0.0143	0.0446	ug/L	1					
Fluorene	U	0.134	0.134	0.446	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	0.0143	0.0143	0.0446	ug/L	1					
Naphthalene	U	0.134	0.134	0.446	ug/L	1					
Phenanthrene	U	0.163	0.163	0.446	ug/L	1					
Pyrene	U	0.0143	0.0143	0.0446	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510 PAH BY HPLC Prep in liquid	RXC1	06/23/14	1045	1397784

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8310		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3510 PAH Extend list Liquid "As Received"	150 ug/L	223	67.3	(21%-96%)

Notes:

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Certificate of Analysis

Report Date: July 2, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3510 PAH Extend list Liquid "As Received"											
Acenaphthene	U	0.147	0.147	0.490	ug/L	1	CWW	06/26/14	0030	1397785	1
Acenaphthylene	U	0.147	0.147	0.490	ug/L	1					
Anthracene	U	0.147	0.147	0.490	ug/L	1					
Benzo(a)anthracene	U	0.0157	0.0157	0.049	ug/L	1					
Benzo(a)pyrene	U	0.0157	0.0157	0.049	ug/L	1					
Benzo(b)fluoranthene	U	0.0157	0.0157	0.049	ug/L	1					
Benzo(ghi)perylene	U	0.0157	0.0157	0.049	ug/L	1					
Benzo(k)fluoranthene	U	0.00784	0.00784	0.0245	ug/L	1					
Chrysene	U	0.0157	0.0157	0.049	ug/L	1					
Dibenzo(a,h)anthracene	U	0.0157	0.0157	0.049	ug/L	1					
Fluoranthene	U	0.0157	0.0157	0.049	ug/L	1					
Fluorene	U	0.147	0.147	0.490	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	0.0157	0.0157	0.049	ug/L	1					
Naphthalene	U	0.147	0.147	0.490	ug/L	1					
Phenanthrene	U	0.178	0.178	0.490	ug/L	1					
Pyrene	U	0.0157	0.0157	0.049	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510 PAH BY HPLC Prep in liquid	RXC1	06/23/14	1045	1397784

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3510 PAH Extend list Liquid "As Received"	153 ug/L	245	62.5	(21%-96%)

Notes:

QC Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 2, 2014

Page 1 of 4

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1397785										
QC1203113780	LCS										
Acenaphthene	50.0			45.3	ug/L		90.6	(53%-107%)	CWW	06/25/14	11:51
Acenaphthylene	50.0			42.2	ug/L		84.4	(52%-100%)			
Anthracene	50.0			50.8	ug/L		102	(70%-130%)			
Benzo(a)anthracene	5.00			4.81	ug/L		96.2	(70%-130%)			
Benzo(a)pyrene	5.00			4.84	ug/L		96.7	(70%-130%)			
Benzo(b)fluoranthene	5.00			4.72	ug/L		94.4	(70%-130%)			
Benzo(ghi)perylene	5.00			4.41	ug/L		88.2	(42%-115%)			
Benzo(k)fluoranthene	2.50			2.56	ug/L		102	(70%-130%)			
Chrysene	5.00			5.06	ug/L		101	(70%-130%)			
Dibenzo(a,h)anthracene	5.00			5.37	ug/L		107	(30%-118%)			
Fluoranthene	5.00			4.53	ug/L		90.7	(70%-130%)			
Fluorene	50.0			45.9	ug/L		91.7	(62%-130%)			
Indeno(1,2,3-cd)pyrene	5.00			5.02	ug/L		100	(57%-114%)			
Naphthalene	50.0			39.6	ug/L		79.1	(54%-108%)			
Phenanthrene	50.0			46.2	ug/L		92.3	(69%-130%)			
Pyrene	5.00			4.75	ug/L		95.1	(70%-130%)			
**Decafluorobiphenyl	250			198	ug/L		79.3	(21%-96%)			
QC1203113779	MB										
Acenaphthene			U	0.150	ug/L					06/25/14	11:09
Acenaphthylene			U	0.150	ug/L						

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1397785										
Anthracene			U	0.150	ug/L						
Benzo(a)anthracene			U	0.016	ug/L				CWW	06/25/14	11:09
Benzo(a)pyrene			U	0.016	ug/L						
Benzo(b)fluoranthene			U	0.016	ug/L						
Benzo(ghi)perylene			U	0.016	ug/L						
Benzo(k)fluoranthene			U	0.008	ug/L						
Chrysene			U	0.016	ug/L						
Dibenzo(a,h)anthracene			U	0.016	ug/L						
Fluoranthene			U	0.016	ug/L						
Fluorene			U	0.150	ug/L						
Indeno(1,2,3-cd)pyrene			U	0.016	ug/L						
Naphthalene			U	0.150	ug/L						
Phenanthrene			U	0.182	ug/L						
Pyrene			U	0.016	ug/L						
**Decafluorobiphenyl	250			177	ug/L		70.9	(21%-96%)			
QC1203113783 350978003 MS											
Acenaphthene	50.0	U	0.134	28.7	ug/L		57.3	(27%-118%)		06/25/14	23:06
Acenaphthylene	50.0	U	0.134	26.7	ug/L		53.5	(26%-121%)			
Anthracene	50.0	U	0.134	35.9	ug/L		71.7	(36%-122%)			
Benzo(a)anthracene	5.00	U	0.0143	3.28	ug/L		65.7	(35%-129%)			
Benzo(a)pyrene	5.00	U	0.0143	3.25	ug/L		65	(25%-135%)			
Benzo(b)fluoranthene	5.00	U	0.0143	3.19	ug/L		63.7	(29%-133%)			
Benzo(ghi)perylene	5.00	U	0.0143	3.01	ug/L		60.1	(27%-140%)			

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1397785										
Benzo(k)fluoranthene	2.50	U	0.00714	1.71	ug/L	68.4	(28%-134%)	CWW	06/25/14	23:06	
Chrysene	5.00	U	0.0143	3.41	ug/L	68.1	(25%-141%)				
Dibenzo(a,h)anthracene	5.00	U	0.0143	3.72	ug/L	74.3	(25%-133%)				
Fluoranthene	5.00	U	0.0143	3.08	ug/L	61.6	(32%-134%)				
Fluorene	50.0	U	0.134	29.2	ug/L	58.4	(29%-123%)				
Indeno(1,2,3-cd)pyrene	5.00	U	0.0143	3.38	ug/L	67.6	(25%-135%)				
Naphthalene	50.0	U	0.134	24.6	ug/L	49.3	(32%-104%)				
Phenanthrene	50.0	U	0.163	30.7	ug/L	61.5	(35%-126%)				
Pyrene	5.00	U	0.0143	3.25	ug/L	65	(32%-134%)				
**Decafluorobiphenyl	250	150		100	ug/L	40.1	(21%-96%)				
QC1203113784 350978003 MSD											
Acenaphthene	50.0	U	0.134	38.2	ug/L	28.6*	76.4	(0%-20%)		06/25/14	23:48
Acenaphthylene	50.0	U	0.134	35.8	ug/L	28.9*	71.5	(0%-20%)			
Anthracene	50.0	U	0.134	43.2	ug/L	18.7	86.5	(0%-20%)			
Benzo(a)anthracene	5.00	U	0.0143	4.06	ug/L	21.2*	81.3	(0%-20%)			
Benzo(a)pyrene	5.00	U	0.0143	4.03	ug/L	21.4*	80.5	(0%-20%)			
Benzo(b)fluoranthene	5.00	U	0.0143	3.91	ug/L	20.5*	78.3	(0%-20%)			
Benzo(ghi)perylene	5.00	U	0.0143	3.70	ug/L	20.8*	74.1	(0%-20%)			
Benzo(k)fluoranthene	2.50	U	0.00714	2.14	ug/L	22.2*	85.5	(0%-20%)			
Chrysene	5.00	U	0.0143	4.18	ug/L	20.5*	83.7	(0%-20%)			
Dibenzo(a,h)anthracene	5.00	U	0.0143	4.60	ug/L	21.3*	92.1	(0%-20%)			
Fluoranthene	5.00	U	0.0143	3.78	ug/L	20.5*	75.6	(0%-20%)			

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1397785										
Fluorene	50.0	U	0.134	37.8	ug/L	25.7*	75.5	(0%-20%)	CWW	06/25/14	23:48
Indeno(1,2,3-cd)pyrene	5.00	U	0.0143	4.18	ug/L	21.1*	83.5	(0%-20%)			
Naphthalene	50.0	U	0.134	31.9	ug/L	25.8*	63.9	(0%-20%)			
Phenanthrene	50.0	U	0.163	38.4	ug/L	22.3*	76.9	(0%-20%)			
Pyrene	5.00	U	0.0143	3.96	ug/L	19.6	79.1	(0%-20%)			
**Decafluorobiphenyl	250	150		143	ug/L		57.3	(21%-96%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous Data

Prep Logbook

Extraction of Semivolatile and Nonvolatile Organic Compounds from Groundwater, Wastewater, and Other Aqueous Samples

Batch ID: 1397784
 Analyst: Rodricous Corbett
 Method: SW846 3510C

Verified by: _____

Lab SOP: GL-OA-E-013 REV# 27
 Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Initial Volume (mL)	Initial pH	Final Volume (mL)	Prepped Factor (mL/mL)
1203113779 MB	23-JUN-2014 10:45:00	1000	7	1	0.001
1203113780 LCS	23-JUN-2014 10:45:00	1000	7	1	0.001
350859001	23-JUN-2014 10:45:00	1100	7	1	0.00091
1203114422 MS (350859001)	23-JUN-2014 10:45:00	500	7	0.5	0.001
1203114423 MSD (350859001)	23-JUN-2014 10:45:00	500	7	0.5	0.001
350859003	23-JUN-2014 10:45:00	1030	7	1	0.00097
350859005	23-JUN-2014 10:45:00	1020	7	1	0.00098
350859007	23-JUN-2014 10:45:00	1050	7	1	0.00095
350859009	23-JUN-2014 10:45:00	1020	7	1	0.00098
350859011	23-JUN-2014 10:45:00	1050	7	1	0.00095
350859013	23-JUN-2014 10:45:00	1020	7	1	0.00098
350978001	23-JUN-2014 10:45:00	1040	7	1	0.00096
350978003	23-JUN-2014 10:45:00	1120	7	1	0.00089
1203113783 MS (350978003)	23-JUN-2014 10:45:00	500	7	0.5	0.001
1203113784 MSD (350978003)	23-JUN-2014 10:45:00	500	7	0.5	0.001
350978005	23-JUN-2014 10:45:00	1020	7	1	0.00098

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203113780	8310 PAH SPIKE	UE140613-10	1	mL	350859001, and its associate MS/MSD, and 350859013 were emulsive during the extraction. No additional CH2Cl2 was needed to break the emulsion. Verified By: SSS Final Solvent: ACN
MS	1203113783	8310 PAH SPIKE	UE140613-10	.5	mL	
MS	1203114422	8310 PAH SPIKE	UE140613-10	.5	mL	
MSD	1203113784	8310 PAH SPIKE	UE140613-10	.5	mL	
MSD	1203114423	8310 PAH SPIKE	UE140613-10	.5	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140604-30	.5	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140604-30	1	mL	
REGNT	All	HPLC Grade Acetonitrile	2103849	5	mL	
REGNT	All	Methylene Chloride	2117042-D	180	mL	
SOURC	All	SODIUM SULFATE	2101676	30	g	

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG X0058**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: NWTPH-Dx

Prep Method: SW846 3535A

Analytical Batch Number: 1397781

Prep Batch Number: 1397778

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203113769	Method Blank (MB)
1203113770	Laboratory Control Sample (LCS)
1203113773	350978001(B2WVT9) Matrix Spike (MS)
1203113774	350978001(B2WVT9) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 24.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350978001 (B2WVT9) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

MSD(1203113774 (B2WVT9)) failed 70.0%-130.0% spike recovery limits for Diesel Range Organics at 66.1% due to sample matrix interference as the MS(1203113773) displayed similarly low, but passing, spike recovery for Diesel Range Organics at 75.6%.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1308432 was generated for this SDG.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT

Mo.Day Yr. 25-JUN-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx	Matrix Type: Liquid	Client Code: WCHN
Batch ID: 1397781	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350859(X0057),350978(X0058) Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. MS(1203113771) failed 70.0%-130.0% spike recovery limits for Diesel Range Organics at 59.9% and Motor Oil at 68.7%. 2. MSD(1203113774) failed 70.0%-130.0% spike recovery limits for Diesel Range Organics at 66.1%.		1. MSD(1203113772) displayed similarly low, but passing, spike recoveries for Diesel Range Organics at 71.4% and Motor Oil at 73.6%. The relative percent difference between the MS and MSD met 0.0%-20.0% acceptance limits for Diesel Range Organics at 3.86% and Motor Oil at 3.25%. As the MS and MSD displayed similar recoveries, the MS failures were attributed to sample matrix interference and the data have been reported. 2. MS(1203113773) displayed similarly low, but passing, spike recovery for Diesel Range Organics at 75.6%. The relative percent difference between the MS and MSD met 0.0%-20.0% acceptance limits for Diesel Range Organics at 12.5%. As the MS and MSD displayed similar recoveries, the MSD failure was attributed to sample matrix interference and the data have been reported.	

Originator's Name:

Josh Brooks

26-JUN-14

Data Validator/Group Leader:

Jimin Cao

26-JUN-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

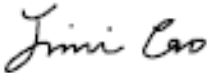
The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Jimin Cao

Date: 27 JUN 2014

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 26, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW846 3535A/NWTPH-Dx DRO "As Received"											
Diesel Range Organics (C10-C20)	JT	108	50.0	500	ug/L	1	JMB3	06/25/14	0639	1397781	1
Motor Oil (C20-C36)	J	277	50.0	500	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3535A	3535A DRO IN LIQ PREP	AXW1	06/23/14	0538	1397778

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	NWTPH-Dx				

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW846 3535A/NWTPH-Dx DRO "As Received"	16.3 ug/L	20.0	81.7	(50%-150%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 26, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW846 3535A/NWTPH-Dx DRO "As Received"											
Diesel Range Organics (C10-C20)	TU	51.0	51.0	500	ug/L	1	JMB3	06/25/14	0836	1397781	1
Motor Oil (C20-C36)	U	51.0	51.0	500	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3535A	3535A DRO IN LIQ PREP	AXW1	06/23/14	0538	1397778

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	NWTPH-Dx				

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW846 3535A/NWTPH-Dx DRO "As Received"	18.7 ug/L	20.4	91.8	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 26, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW846 3535A/NWTPH-Dx DRO "As Received"											
Diesel Range Organics (C10-C20)	JT	77.3	53.2	500	ug/L	1	JMB3	06/25/14	0914	1397781	1
Motor Oil (C20-C36)	J	71.5	53.2	500	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3535A	3535A DRO IN LIQ PREP	AXW1	06/23/14	0538	1397778

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	NWTPH-Dx				

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW846 3535A/NWTPH-Dx DRO "As Received"	19.7 ug/L	21.3	92.7	(50%-150%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: June 26, 2014

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1397781										
QC1203113770	LCS										
Diesel Range Organics (C10-C20)	2000			1650	ug/L		82.7	(70%-130%)	JMB3	06/25/14	09:53
Motor Oil (C20-C36)	2000			1840	ug/L		92.2	(70%-130%)			
**o-Terphenyl	20.0			18.1	ug/L		90.7	(50%-150%)			
QC1203113769	MB										
Diesel Range Organics (C10-C20)			U	50.0	ug/L					06/24/14	20:36
Motor Oil (C20-C36)			U	50.0	ug/L						
**o-Terphenyl	20.0			13.1	ug/L		65.5	(50%-150%)			
QC1203113773	350978001 MS										
Diesel Range Organics (C10-C20)	2000	JT	108	1620	ug/L		75.6	(70%-130%)		06/25/14	07:18
Motor Oil (C20-C36)	2000	J	277	2010	ug/L		86.4	(70%-130%)			
**o-Terphenyl	20.0		16.3	17.5	ug/L		87.4	(50%-150%)			
QC1203113774	350978001 MSD										
Diesel Range Organics (C10-C20)	2000	JT	108	T	1430	ug/L	12.5	66.1 *	(0%-20%)	06/25/14	07:57
Motor Oil (C20-C36)	2000	J	277	1770	ug/L	12.5	74.6	(0%-20%)			
**o-Terphenyl	20.0		16.3	15.4	ug/L		76.8	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
P	Aroclor target analyte with greater than 25% difference between column analyses.										
T	Spike and/or spike duplicate sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
o	Analyte failed to recover within LCS limits (Organics only)										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Prep Logbook

Extraction of Semivolatile and Nonvolatile Organic Compounds from Groundwater, Wastewater, and Other Aqueous Samples

Batch ID: 1397778
 Analyst: Alton Willis
 Method: SW846 3535A

Verified by: _____

Lab SOP: GL-OA-E-013 REV# 27
 Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Initial Volume (mL)	Ph 1	Ph 2	Final Volume (mL)	Prepped Factor (mL/mL)
1203113769 MB	23-JUN-2014 14:06:00	1000	7	1	1	0.001
1203113770 LCS	23-JUN-2014 14:06:00	1000	7	1	1	0.001
350859001	23-JUN-2014 14:06:00	1000	7	1	1	0.001
1203113771 MS (350859001)	23-JUN-2014 14:06:00	500	7	1	0.5	0.001
1203113772 MSD (350859001)	23-JUN-2014 14:06:00	500	7	1	0.5	0.001
350859003	23-JUN-2014 14:06:00	1020	4	1	1	0.00098
350859005	23-JUN-2014 14:06:00	980	4	1	1	0.00102
350859007	23-JUN-2014 14:06:00	940	7	1	1	0.00106
350859009	23-JUN-2014 14:06:00	980	4	1	1	0.00102
350859011	23-JUN-2014 14:06:00	1020	4	1	1	0.00098
350859013	23-JUN-2014 14:06:00	960	4	1	1	0.00104
350978001	23-JUN-2014 14:06:00	1000	4	1	1	0.001
1203113773 MS (350978001)	23-JUN-2014 14:06:00	500	4	1	0.5	0.001
1203113774 MSD (350978001)	23-JUN-2014 14:06:00	500	4	1	0.5	0.001
350978003	23-JUN-2014 14:06:00	980	4	1	1	0.00102
350978005	23-JUN-2014 14:06:00	940	4	1	1	0.00106

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203113770	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	Final Solvent:CH2CL2 Verified By:DPF
MS	1203113771	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	.5	mL	
MS	1203113773	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	.5	mL	
MSD	1203113772	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	.5	mL	
MSD	1203113774	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	.5	mL	
SURR	All	20 ppm surrogate	WE140520-04	.5	mL	
SURR	All	20 ppm surrogate	WE140520-04	1	mL	
REGNT	All	Methylene Chloride	2117042-D	180	mL	
REGNT	All	1:1 sulfuric acid	2120518	15	mL	
SOURC	All	SODIUM SULFATE	2101676	30	g	

GC Volatiles (GRO) Analysis

Case Narrative

**GC Volatile Organics
WC-HANFORD, INC. (WCHN)
SDG X0058**

Method/Analysis Information

Procedure: Volatile Total Petroleum Hydrocarbons by Flame Ionization Detector
Analytical Method: NWTPH-Gx
Analytical Batch Number: 1398511

Sample Analysis

The following client and quality control samples were analyzed to complete this sample delivery group/work order using the methods referenced in the Analysis Information section:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203115579	Method Blank (MB)
1203115582	Laboratory Control Sample (LCS)
1203116564	350978003(B2WVV2) Post Spike (PS)
1203116565	350978003(B2WVV2) Post Spike Duplicate (PSD)

The samples in this SDG were analyzed on an "as received" basis.

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

Gasoline Range Organics will be designated as GRO throughout this case narrative.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 19.1.2. False positive analytes are designated on the quantitation report with a 'd' qualifier.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-004 REV# 25.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG). See the calibration history report for a list of data files that were used to generate the initial calibration curve in the Standard Data Section of this data package.

CCV Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Surrogate recoveries, in all samples and quality control samples, were within the acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350978003 (B2WVV2) was selected for analysis as the matrix spike.

Matrix Spike (PS) Recovery Statement

The GRO recovery was within the acceptance limits.

Matrix Spike Duplicate (PSD) Recovery Statement

The GRO recovery was within the acceptance limits.

Relative Percent Difference (RPD) Statement

The RPD between the matrix spike pair met the acceptance limits.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integrations

Data files associated with the initial calibration, continuing calibration check(s), and samples may have been manually integrated to correct misidentification of peaks by the integration software.

Additional Comments

Additional comments were not required for this SDG.

System Configuration

The GRO Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOC4A.I	Agilent 6890N GC/FID w/ OI 4560/Archon Autosampler	HP6890N GC/FID	DB-624	0.53mm x 3.0u x 15m	OI #10

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

The Qualifiers in this report are defined as follows:

J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

DL Indicates that sample is diluted.

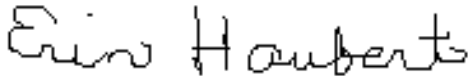
RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 02 JUL 2014

Title: Data Validator

Sample Data Summary

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Certificate of Analysis

Report Date: July 1, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatiles GRO Organics											
NWTPH-Gx GRO Liquid "As Received"											
Gasoline Range Organics (C6 - C10)	U	16.7	16.7	500	ug/L	1	RXY1	06/30/14	1332	1398511	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments									
1	NWTPH-Gx										
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits						
Bromofluorobenzene	NWTPH-Gx GRO Liquid "As Received"	50.6 ug/L	50.0	101	(50%-150%)						

Notes:

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Certificate of Analysis

Report Date: July 1, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatiles GRO Organics											
NWTPH-Gx GRO Liquid "As Received"											
Gasoline Range Organics (C6 - C10)	U	16.7	16.7	500	ug/L	1	RXY1	06/30/14	1359	1398511	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments									
1	NWTPH-Gx										
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits						
Bromofluorobenzene	NWTPH-Gx GRO Liquid "As Received"	52.9 ug/L	50.0	106	(50%-150%)						

Notes:

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Certificate of Analysis

Report Date: July 1, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatiles GRO Organics											
NWTPH-Gx GRO Liquid "As Received"											
Gasoline Range Organics (C6 - C10)	U	16.7	16.7	500	ug/L	1	RXY1	06/30/14	1427	1398511	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments									
1	NWTPH-Gx										
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits						
Bromofluorobenzene	NWTPH-Gx GRO Liquid "As Received"	52.3 ug/L	50.0	105	(50%-150%)						

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: July 2, 2014

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WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatiles GRO Organics											
Batch	1398511										
QC1203115582	LCS										
Gasoline Range Organics (C6 - C10)	500			519	ug/L		104	(70%-130%)	RXY1	06/30/14	08:21
**Bromofluorobenzene	50.0			46.5	ug/L		93	(50%-150%)			
QC1203115579	MB										
Gasoline Range Organics (C6 - C10)			U	16.7	ug/L					06/30/14	08:48
**Bromofluorobenzene	50.0			51.9	ug/L		104	(50%-150%)			
QC1203116564	350978003	PS									
Gasoline Range Organics (C6 - C10)	500	U	0.00	J	490	ug/L	98.1	(70%-130%)		06/30/14	15:48
**Bromofluorobenzene	50.0		52.9	53.3	ug/L		107	(50%-150%)			
QC1203116565	350978003	PSD									
Gasoline Range Organics (C6 - C10)	500	U	0.00	J	469	ug/L	4.38	93.9	(0%-20%)	06/30/14	16:15
**Bromofluorobenzene	50.0		52.9	54.6	ug/L		109	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

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2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG X0058**

Sample Analysis

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203112512	Method Blank (MB) ICP
1203120249	Method Blank (MB) ICP
1203112513	Laboratory Control Sample (LCS)
1203120250	Laboratory Control Sample (LCS)
1203112516	350978001(B2WVT9L) Serial Dilution (SD)
1203112514	350978001(B2WVT9S) Matrix Spike (MS)
1203112515	350978001(B2WVT9SD) Matrix Spike Duplicate (MSD)
1203120842	350978001(B2WVT9PS) Post Spike (PS)
1203112517	Method Blank (MB) ICP-MS
1203112518	Laboratory Control Sample (LCS)
1203112521	350978001(B2WVT9L) Serial Dilution (SD)
1203112519	350978001(B2WVT9S) Matrix Spike (MS)
1203112520	350978001(B2WVT9SD) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1397282, 1400344 and 1397284
Prep Batch :	1397281, 1400343 and 1397283
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 10, GL-MA-E-006 REV# 11 and GL-MA-E-014 REV# 25
Analytical Method:	SW846 3005A/6010C and SW846 3005A/6020A
Prep Method :	SW846 3005A

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 0.4L/min, argon gas flows of 13 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 0.4L/min, argon gas flows of 13 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 350978001 (B2WVT9)-ICP and ICP-MS.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. Not all the MS recoveries were within the acceptance limits. The recovery for tin was not within the acceptance limits in sample 1203112514 (B2WVT9)-ICP.

Matrix Spike Duplicate (MSD) Recovery Statement

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. Not all the MSD recoveries were within the acceptance limits. The recovery for tin was not within the acceptance limits in sample 1203112515 (B2WVT9)-ICP.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the established acceptance percent difference criteria.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences in the post-digested sample.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 350978001 (B2WVT9), 350978003 (B2WVV2) and 350978005 (B2WVV5)-ICP were diluted for tin in order to minimize suppression due to matrix interferences.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The

signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. The following DER was generated for this SDG: 1311273. ICP.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:

Pat Steell Date: 07/07/14

DATA EXCEPTION REPORT			
Mo.Day Yr. 03-JUL-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3005A/6010C	Matrix Type: Liquid	Client Code: WCHN
Batch ID: 1400344	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350978(X0058) Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/PS: QC 1203112514MS 2. Failed Recovery for MSD/PSD: QC 1203112515MSD		1./2. The matrix spike and matrix spike duplicate recovery failed outside of the control limits for tin. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference.	

Originator's Name:

Helen Camello 03-JUL-14

Data Validator/Group Leader:

Louise Smith 07-JUL-14

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by

Pat Steele 07/07/14

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
6010_METALS_ICP(Supertrace):COMMON (Add-on) "As Received"											
Aluminum	U	68.0	68.0	200	ug/L	1	HSC	06/27/14	0900	1397282	1
Antimony	B	6.32	3.50	10.0	ug/L	1					
Arsenic	U	5.00	5.00	30.0	ug/L	1					
Barium		63.9	1.00	5.00	ug/L	1					
Beryllium	U	1.00	1.00	5.00	ug/L	1					
Boron	B	27.2	15.0	50.0	ug/L	1					
Cadmium	U	1.00	1.00	5.00	ug/L	1					
Calcium		98100	50.0	200	ug/L	1					
Chromium		6.78	1.00	5.00	ug/L	1					
Cobalt	U	1.00	1.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	ug/L	1					
Iron		209	30.0	100	ug/L	1					
Magnesium		20300	110	300	ug/L	1					
Manganese		12.5	2.00	10.0	ug/L	1					
Molybdenum	U	2.00	2.00	10.0	ug/L	1					
Nickel	U	1.50	1.50	5.00	ug/L	1					
Phosphorous	B	65.7	60.0	150	ug/L	1					
Potassium		5890	50.0	150	ug/L	1					
Silicon		11800	25.0	100	ug/L	1					
Silver	U	1.00	1.00	5.00	ug/L	1					
Sodium		64700	100	300	ug/L	1					
Strontium		418	1.00	5.00	ug/L	1					
Thallium	U	5.00	5.00	20.0	ug/L	1					
Vanadium	B	3.55	1.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	ug/L	1					
Lead	U	3.30	3.30	10.0	ug/L	1	HSC	07/02/14	1153	1397282	2
Selenium	B	19.4	6.00	30.0	ug/L	1					
Uranium	B	10.6	10.0	50.0	ug/L	1					
Tin	DNU	50.0	50.0	200	ug/L	20	HSC	07/03/14	1306	1400344	3
Metals Analysis-ICP-MS											
SW846 3005A/6020A Liquid - lithium & bismuth "As Received"											
Bismuth	U	0.500	0.500	100	ug/L	1	BAJ	06/26/14	1507	1397284	4
Lithium	B	4.98	2.00	25.0	ug/L	1	BAJ	06/26/14	1803	1397284	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001

Project: WCHN RC-236A
Client ID: WCHN001

SW846 3005A	ICP-MS 3005A PREP	JXM5	06/20/14	0700	1397283
SW846 3005A	SW846 3005A for 6010C	JXM5	06/20/14	0700	1397281
SW846 3005A	SW846 3005A for 6010C	KXP3	07/03/14	0930	1400343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6010C	
4	SW846 3005A/6020A	
5	SW846 3005A/6020A	

Notes:

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Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
6010_METALS_ICP(Supertrace):COMMON (Add-on) "As Received"											
Aluminum	U	68.0	68.0	200	ug/L	1	HSC	06/27/14	0854	1397282	1
Antimony	B	5.21	3.50	10.0	ug/L	1					
Arsenic	B	6.49	5.00	30.0	ug/L	1					
Barium		137	1.00	5.00	ug/L	1					
Beryllium	U	1.00	1.00	5.00	ug/L	1					
Boron	B	29.8	15.0	50.0	ug/L	1					
Cadmium	U	1.00	1.00	5.00	ug/L	1					
Calcium		146000	50.0	200	ug/L	1					
Chromium	B	4.34	1.00	5.00	ug/L	1					
Cobalt	U	1.00	1.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	ug/L	1					
Iron	B	43.7	30.0	100	ug/L	1					
Magnesium		26100	110	300	ug/L	1					
Manganese		22.3	2.00	10.0	ug/L	1					
Molybdenum	U	2.00	2.00	10.0	ug/L	1					
Nickel	U	1.50	1.50	5.00	ug/L	1					
Phosphorous	B	70.6	60.0	150	ug/L	1					
Potassium		4160	50.0	150	ug/L	1					
Silicon		9900	25.0	100	ug/L	1					
Silver	B	1.49	1.00	5.00	ug/L	1					
Sodium		22100	100	300	ug/L	1					
Strontium		590	1.00	5.00	ug/L	1					
Thallium	U	5.00	5.00	20.0	ug/L	1					
Vanadium	B	2.40	1.00	5.00	ug/L	1					
Zinc	B	8.08	3.30	10.0	ug/L	1					
Lead	U	3.30	3.30	10.0	ug/L	1	HSC	07/02/14	1148	1397282	2
Selenium	U	6.00	6.00	30.0	ug/L	1					
Uranium	B	11.3	10.0	50.0	ug/L	1					
Tin	DNU	50.0	50.0	200	ug/L	20	HSC	07/03/14	1300	1400344	3
Metals Analysis-ICP-MS											
SW846 3005A/6020A Liquid - lithium & bismuth "As Received"											
Bismuth	U	0.500	0.500	100	ug/L	1	BAJ	06/26/14	1520	1397284	4
Lithium	U	2.00	2.00	25.0	ug/L	1	BAJ	06/26/14	1812	1397284	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003

Project: WCHN RC-236A
Client ID: WCHN001

SW846 3005A	ICP-MS 3005A PREP	JXM5	06/20/14	0700	1397283
SW846 3005A	SW846 3005A for 6010C	JXM5	06/20/14	0700	1397281
SW846 3005A	SW846 3005A for 6010C	KXP3	07/03/14	0930	1400343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6010C	
4	SW846 3005A/6020A	
5	SW846 3005A/6020A	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
6010_METALS_ICP(Supertrace):COMMON (Add-on) "As Received"											
Aluminum	U	68.0	68.0	200	ug/L	1	HSC	06/27/14	0857	1397282	1
Antimony	B	4.92	3.50	10.0	ug/L	1					
Arsenic	B	6.50	5.00	30.0	ug/L	1					
Barium		89.1	1.00	5.00	ug/L	1					
Beryllium	U	1.00	1.00	5.00	ug/L	1					
Boron	B	43.5	15.0	50.0	ug/L	1					
Cadmium	U	1.00	1.00	5.00	ug/L	1					
Calcium		157000	50.0	200	ug/L	1					
Chromium	B	3.52	1.00	5.00	ug/L	1					
Cobalt	U	1.00	1.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	ug/L	1					
Iron	U	30.0	30.0	100	ug/L	1					
Magnesium		27500	110	300	ug/L	1					
Manganese	U	2.00	2.00	10.0	ug/L	1					
Molybdenum	U	2.00	2.00	10.0	ug/L	1					
Nickel	U	1.50	1.50	5.00	ug/L	1					
Phosphorous	B	69.6	60.0	150	ug/L	1					
Potassium		5050	50.0	150	ug/L	1					
Silicon		12000	25.0	100	ug/L	1					
Silver	B	1.34	1.00	5.00	ug/L	1					
Sodium		33400	100	300	ug/L	1					
Strontium		652	1.00	5.00	ug/L	1					
Thallium	U	5.00	5.00	20.0	ug/L	1					
Vanadium	B	1.41	1.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	ug/L	1					
Lead	U	3.30	3.30	10.0	ug/L	1	HSC	07/02/14	1150	1397282	2
Selenium	B	14.7	6.00	30.0	ug/L	1					
Uranium	U	10.0	10.0	50.0	ug/L	1					
Tin	DNU	50.0	50.0	200	ug/L	20	HSC	07/03/14	1303	1400344	3
Metals Analysis-ICP-MS											
SW846 3005A/6020A Liquid - lithium & bismuth "As Received"											
Bismuth	U	0.500	0.500	100	ug/L	1	BAJ	06/26/14	1523	1397284	4
Lithium	B	5.51	2.00	25.0	ug/L	1	BAJ	06/26/14	1814	1397284	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 7, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005

Project: WCHN RC-236A
Client ID: WCHN001

SW846 3005A	ICP-MS 3005A PREP	JXM5	06/20/14	0700	1397283
SW846 3005A	SW846 3005A for 6010C	JXM5	06/20/14	0700	1397281
SW846 3005A	SW846 3005A for 6010C	KXP3	07/03/14	0930	1400343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6010C	
4	SW846 3005A/6020A	
5	SW846 3005A/6020A	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 7, 2014

Page 1 of 9

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1397284										
QC1203112518	LCS										
Bismuth	50.0		B	55.4	ug/L		111	(80%-120%)	BAJ	06/26/14	15:04
Lithium	50.0			49.6	ug/L		99.2	(80%-120%)		06/26/14	18:01
QC1203112517	MB										
Bismuth			U	0.500	ug/L					06/26/14	15:00
Lithium			U	2.00	ug/L					06/26/14	17:59
QC1203112519	350978001 MS										
Bismuth	50.0	U	0.500	B	53.6	ug/L		107	(75%-125%)	06/26/14	15:10
Lithium	50.0	B	4.98		52.9	ug/L		95.8	(75%-125%)	06/26/14	18:06
QC1203112520	350978001 MSD										
Bismuth	50.0	U	0.500	B	53.8	ug/L	0.419	107	(0%-20%)	06/26/14	15:13
Lithium	50.0	B	4.98		54.0	ug/L	2.11	98	(0%-20%)	06/26/14	18:08
QC1203112521	350978001 SDILT										
Bismuth		U	0.115	DU	2.50	ug/L	N/A			06/26/14	15:17
Lithium		B	4.98	DU	10.0	ug/L	N/A	(0%-10%)		06/26/14	18:10
Metals Analysis-ICP											
Batch	1397282										
QC1203112513	LCS										
Aluminum	5000			4970	ug/L		99.4	(80%-120%)	HSC	06/27/14	08:51
Antimony	500			491	ug/L		98.1	(80%-120%)			
Arsenic	500			486	ug/L		97.2	(80%-120%)			
Barium	500			499	ug/L		99.8	(80%-120%)			
Beryllium	500			496	ug/L		99.2	(80%-120%)			
Boron	500			479	ug/L		95.7	(80%-120%)			
Cadmium	500			489	ug/L		97.9	(80%-120%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Calcium	5000			5000	ug/L		100	(80%-120%)	HSC	06/27/14	08:51
Chromium	500			500	ug/L		100	(80%-120%)			
Cobalt	500			495	ug/L		99	(80%-120%)			
Copper	500			499	ug/L		99.8	(80%-120%)			
Iron	5000			5110	ug/L		102	(80%-120%)			
Lead	500			513	ug/L		103	(80%-120%)		07/02/14	11:45
Magnesium	5000			5220	ug/L		104	(80%-120%)		06/27/14	08:51
Manganese	500			501	ug/L		100	(80%-120%)			
Molybdenum	500			493	ug/L		98.7	(80%-120%)			
Nickel	500			487	ug/L		97.4	(80%-120%)			
Phosphorous	500			465	ug/L		93	(80%-120%)			
Potassium	5000			5000	ug/L		100	(80%-120%)			
Selenium	500			507	ug/L		101	(80%-120%)		07/02/14	11:45
Silicon	5000			4740	ug/L		94.8	(80%-120%)		06/27/14	08:51
Silver	500			509	ug/L		102	(80%-120%)			
Sodium	5000			5020	ug/L		100	(80%-120%)			
Strontium	500			495	ug/L		98.9	(80%-120%)			
Thallium	500			494	ug/L		98.9	(80%-120%)			
Uranium	500			479	ug/L		95.9	(80%-120%)		07/02/14	11:45
Vanadium	500			520	ug/L		104	(80%-120%)		06/27/14	08:51
Zinc	500			494	ug/L		98.8	(80%-120%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
QC1203112512	MB										
Aluminum			U	68.0	ug/L				HSC	06/27/14	08:47
Antimony			U	3.50	ug/L						
Arsenic			U	5.00	ug/L						
Barium			U	1.00	ug/L						
Beryllium			U	1.00	ug/L						
Boron			U	15.0	ug/L						
Cadmium			U	1.00	ug/L						
Calcium			U	50.0	ug/L						
Chromium			U	1.00	ug/L						
Cobalt			U	1.00	ug/L						
Copper			U	3.00	ug/L						
Iron			U	30.0	ug/L						
Lead			U	3.30	ug/L					07/02/14	11:42
Magnesium			U	110	ug/L					06/27/14	08:47
Manganese			U	2.00	ug/L						
Molybdenum			U	2.00	ug/L						
Nickel			U	1.50	ug/L						
Phosphorous			U	60.0	ug/L						
Potassium			U	50.0	ug/L						
Selenium			U	6.00	ug/L					07/02/14	11:42
Silicon			U	25.0	ug/L					06/27/14	08:47
Silver			U	1.00	ug/L						

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 4 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Sodium			U	100	ug/L				HSC	06/27/14	08:47
Strontium			U	1.00	ug/L						
Thallium			U	5.00	ug/L						
Uranium			U	10.0	ug/L					07/02/14	11:42
Vanadium			U	1.00	ug/L					06/27/14	08:47
Zinc			U	3.30	ug/L						
QC1203112514 350978001 MS											
Aluminum	5000	U	68.0	5160	ug/L		102	(75%-125%)		06/27/14	09:03
Antimony	500	B	6.32	514	ug/L		102	(75%-125%)			
Arsenic	500	U	5.00	519	ug/L		104	(75%-125%)			
Barium	500		63.9	562	ug/L		99.5	(75%-125%)			
Beryllium	500	U	1.00	500	ug/L		100	(75%-125%)			
Boron	500	B	27.2	539	ug/L		102	(75%-125%)			
Cadmium	500	U	1.00	484	ug/L		96.7	(75%-125%)			
Calcium	5000		98100	106000	ug/L		N/A	(75%-125%)			
Chromium	500		6.78	501	ug/L		98.9	(75%-125%)			
Cobalt	500	U	1.00	481	ug/L		96.2	(75%-125%)			
Copper	500	U	3.00	518	ug/L		103	(75%-125%)			
Iron	5000		209	5320	ug/L		102	(75%-125%)			
Lead	500	U	3.30	497	ug/L		99.4	(75%-125%)		07/02/14	11:56
Magnesium	5000		20300	26000	ug/L		N/A	(75%-125%)		06/27/14	09:03
Manganese	500		12.5	503	ug/L		98.2	(75%-125%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Molybdenum	500	U	2.00	512	ug/L		102	(75%-125%)	HSC	06/27/14	09:03
Nickel	500	U	1.50	481	ug/L		96	(75%-125%)			
Phosphorous	500	B	65.7	561	ug/L		99	(75%-125%)			
Potassium	5000		5890	10700	ug/L		96.1	(75%-125%)			
Selenium	500	B	19.4	510	ug/L		98.1	(75%-125%)		07/02/14	11:56
Silicon	5000		11800	16800	ug/L		99.3	(75%-125%)		06/27/14	09:03
Silver	500	U	1.00	518	ug/L		104	(75%-125%)			
Sodium	5000		64700	71700	ug/L		N/A	(75%-125%)			
Strontium	500		418	918	ug/L		99.9	(75%-125%)			
Thallium	500	U	5.00	508	ug/L		102	(75%-125%)			
Uranium	500	B	10.6	495	ug/L		96.9	(75%-125%)		07/02/14	11:56
Vanadium	500	B	3.55	538	ug/L		107	(75%-125%)		06/27/14	09:03
Zinc	500	U	3.30	491	ug/L		98.3	(75%-125%)			
QC1203112515	350978001	MSD									
Aluminum	5000	U	68.0	5130	ug/L	0.571	101	(0%-20%)		06/27/14	09:07
Antimony	500	B	6.32	514	ug/L	0.103	101	(0%-20%)			
Arsenic	500	U	5.00	513	ug/L	1.28	102	(0%-20%)			
Barium	500		63.9	560	ug/L	0.242	99.3	(0%-20%)			
Beryllium	500	U	1.00	498	ug/L	0.403	99.6	(0%-20%)			
Boron	500	B	27.2	535	ug/L	0.682	102	(0%-20%)			
Cadmium	500	U	1.00	483	ug/L	0.0455	96.7	(0%-20%)			
Calcium	5000		98100	105000	ug/L	0.833	N/A	(0%-20%)			

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Chromium	500		6.78	500	ug/L	0.250	98.6	(0%-20%)	HSC	06/27/14	09:07
Cobalt	500	U	1.00	480	ug/L	0.271	96	(0%-20%)			
Copper	500	U	3.00	516	ug/L	0.292	103	(0%-20%)			
Iron	5000		209	5300	ug/L	0.307	102	(0%-20%)			
Lead	500	U	3.30	492	ug/L	0.962	98.5	(0%-20%)		07/02/14	11:59
Magnesium	5000		20300	25700	ug/L	1.23	N/A	(0%-20%)		06/27/14	09:07
Manganese	500		12.5	504	ug/L	0.0298	98.2	(0%-20%)			
Molybdenum	500	U	2.00	511	ug/L	0.285	102	(0%-20%)			
Nickel	500	U	1.50	480	ug/L	0.208	95.8	(0%-20%)			
Phosphorous	500	B	65.7	546	ug/L	2.71	96	(0%-20%)			
Potassium	5000		5890	10700	ug/L	0.0748	95.9	(0%-20%)			
Selenium	500	B	19.4	509	ug/L	0.196	97.9	(0%-20%)		07/02/14	11:59
Silicon	5000		11800	16600	ug/L	1.06	95.7	(0%-20%)		06/27/14	09:07
Silver	500	U	1.00	516	ug/L	0.443	103	(0%-20%)			
Sodium	5000		64700	70400	ug/L	1.87	N/A	(0%-20%)			
Strontium	500		418	916	ug/L	0.218	99.5	(0%-20%)			
Thallium	500	U	5.00	499	ug/L	1.86	99.8	(0%-20%)			
Uranium	500	B	10.6	504	ug/L	1.85	98.8	(0%-20%)		07/02/14	11:59
Vanadium	500	B	3.55	537	ug/L	0.281	107	(0%-20%)		06/27/14	09:07
Zinc	500	U	3.30	492	ug/L	0.0488	98.3	(0%-20%)			
QC1203112516	350978001	SDILT									
Aluminum		U	63.3	DU	340	ug/L	N/A	(0%-10%)		06/27/14	09:10

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Antimony	B	6.32	DU	17.5	ug/L	N/A		(0%-10%)	HSC	06/27/14	09:10
Arsenic	U	0.731	DU	25.0	ug/L	N/A		(0%-10%)			
Barium		63.9	D	13.6	ug/L	6.19		(0%-10%)			
Beryllium	U	0.0368	DU	5.00	ug/L	N/A		(0%-10%)			
Boron	B	27.2	DU	75.0	ug/L	N/A		(0%-10%)			
Cadmium	U	-0.499	DU	5.00	ug/L	N/A		(0%-10%)			
Calcium		98100	D	20600	ug/L	5.12		(0%-10%)			
Chromium		6.78	D	1.81	ug/L	33.3		(0%-10%)			
Cobalt	U	-0.616	DU	5.00	ug/L	N/A		(0%-10%)			
Copper	U	1.13	DU	15.0	ug/L	N/A		(0%-10%)			
Iron		209	D	45.3	ug/L	8.48		(0%-10%)			
Lead	U	-4.47	DU	16.5	ug/L	N/A		(0%-10%)		07/02/14	12:02
Magnesium		20300	D	4340	ug/L	6.53		(0%-10%)		06/27/14	09:10
Manganese		12.5	D	2.64	ug/L	5.9		(0%-10%)			
Molybdenum	U	1.88	DU	10.0	ug/L	N/A		(0%-10%)			
Nickel	U	0.692	DU	7.50	ug/L	N/A		(0%-10%)			
Phosphorous	B	65.7	DU	300	ug/L	N/A		(0%-10%)			
Potassium		5890	D	1240	ug/L	5.24		(0%-10%)			
Selenium	B	19.4	DU	30.0	ug/L	N/A		(0%-10%)		07/02/14	12:02
Silicon		11800	D	2360	ug/L	.144		(0%-10%)		06/27/14	09:10
Silver	U	0.322	DU	5.00	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1397282										
Sodium		64700	D	13500	ug/L	4.57		(0%-10%)			
Strontium		418	D	86.5	ug/L	3.4		(0%-10%)	HSC	06/27/14	09:10
Thallium	U	-4.3	DU	25.0	ug/L	N/A		(0%-10%)			
Uranium	B	10.6	DU	50.0	ug/L	N/A		(0%-10%)		07/02/14	12:02
Vanadium	B	3.55	DU	5.00	ug/L	N/A		(0%-10%)		06/27/14	09:10
Zinc	U	-2.08	DU	16.5	ug/L	N/A		(0%-10%)			
Batch	1400344										
QC1203120250	LCS										
Tin	500			497	ug/L		99.3	(80%-120%)	HSC	07/03/14	12:45
QC1203120249	MB										
Tin			U	2.50	ug/L					07/03/14	12:42
QC1203112514	350978001 MSD										
Tin	500 DNU	50.0	DN	327	ug/L		65.5 *	(75%-125%)		07/03/14	13:09
QC1203112515	350978001 MSD										
Tin	500 DNU	50.0	DN	354	ug/L	7.91	70.9 *	(0%-20%)		07/03/14	13:12
QC1203120842	350978001 PS										
Tin	500 DNU	-2.94	D	556	ug/L		111	(80%-120%)		07/03/14	14:29
QC1203112516	350978001 SDILT										
Tin	DNU	-2.94	DU	250	ug/L	N/A		(0%-10%)		07/03/14	13:14

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Prep Logbook

Acid Digestion of Total Recoverable or Dissolved Metals in Surface and Groundwater Samples for Analysis by ICP or ICP-MS

Batch ID:	1397281	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Jack Mabry	LCS	1203112513	Metals Spike Mix I	UI2087802-01	.25	mL
Method:	SW846 3005A	LCS	1203112513	Metals Spike Mix II	UI2087804-06	.25	mL
Lab SOP:	GL-MA-E-006 REV# 10	MS	1203112514	Metals Spike Mix I	UI2087802-01	.25	mL
Instrument:	Metals Manual Instrument	MS	1203112514	Metals Spike Mix II	UI2087804-06	.25	mL
		MSD	1203112515	Metals Spike Mix I	UI2087802-01	.25	mL
		MSD	1203112515	Metals Spike Mix II	UI2087804-06	.25	mL

Sample ID	Run Date	Matrix	Initial Volume (mL)	Final Volume (mL)	Prep Factor (mL/mL)	pH Check
1203112512 MB	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112513 LCS	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978001	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112514 MS (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112515 MSD (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112516 SDILT (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978003	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978005	20-JUN-2014 07:00:47	Water	50	50	1	<2

Reagent/Solvent Lot ID	Description	Amount	Comments:
2098276	HYDROCHLORIC ACID	2.5 mL	Block Temperature: 90 C
2110352	Concentrated Nitric Acid	1 mL	Thermometer ID: 61066-a1 Hot Block ID: 8

Prep Logbook

Acid Digestion of Total Recoverable or Dissolved Metals in Surface and Groundwater Samples for Analysis by ICP or ICP-MS

Batch ID:	1400343	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Karen Paolucci	LCS	1203120250	Metals Spike Mix I	UI2087802-01	.125	mL
Method:	SW846 3005A	LCS	1203120250	Metals Spike Mix II	UI2087804-06	.125	mL
Lab SOP:	GL-MA-E-006 REV# 11	MS	1203112514	Metals Spike Mix I	UI2087802-01	.125	mL
Instrument:	Metals Manual Instrument	MS	1203112514	Metals Spike Mix II	UI2087804-06	.125	mL
		MSD	1203112515	Metals Spike Mix I	UI2087802-01	.125	mL
		MSD	1203112515	Metals Spike Mix II	UI2087804-06	.125	mL

Sample ID	Run Date	Matrix	Initial Volume (mL)	Final Volume (mL)	Prep Factor (mL/mL)	pH Check
1203120249 MB	03-JUL-2014 09:30:34	Water	25	25	1	<2
1203120250 LCS	03-JUL-2014 09:30:34	Water	25	25	1	<2
350978001 - 2	03-JUL-2014 09:30:34	Water	25	25	1	<2
1203112514 - 2 MS (350978001)	03-JUL-2014 09:30:34	Water	25	25	1	<2
1203112515 - 2 MSD (350978001)	03-JUL-2014 09:30:34	Water	25	25	1	<2
1203112516 - 2 SDILT (350978001)	03-JUL-2014 09:30:34	Water	25	25	1	<2
350978003 - 2	03-JUL-2014 09:30:34	Water	25	25	1	<2
350978005 - 2	03-JUL-2014 09:30:34	Water	25	25	1	<2

Reagent/Solvent Lot ID	Description	Amount	Comments:
140610	HYDROCHLORIC ACID	1.25 mL	Block Temperature: 95 C
2110352	Concentrated Nitric Acid	.5 mL	Thermometer ID: 119015
			Hot Block ID: 13

Prep Logbook

Acid Digestion of Total Recoverable or Dissolved Metals in Surface and Groundwater Samples for Analysis by ICP or ICP-MS

Batch ID:	1397283	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Jack Mabry	LCS	1203112518	ICP-MS spiking soluiton A	UI2091842-A	.25	mL
Method:	SW846 3005A	LCS	1203112518	ICP-MS spiking solution B	UI2091844-B	.25	mL
Lab SOP:	GL-MA-E-006 REV# 10	MS	1203112519	ICP-MS spiking soluiton A	UI2091842-A	.25	mL
Instrument:	Metals Manual Instrument	MS	1203112519	ICP-MS spiking solution B	UI2091844-B	.25	mL
		MSD	1203112520	ICP-MS spiking soluiton A	UI2091842-A	.25	mL
		MSD	1203112520	ICP-MS spiking solution B	UI2091844-B	.25	mL

Sample ID	Run Date	Matrix	Initial Volume (mL)	Final Volume (mL)	Prep Factor (mL/mL)	pH Check
1203112517 MB	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112518 LCS	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978001	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112519 MS (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112520 MSD (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
1203112521 SDILT (350978001)	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978003	20-JUN-2014 07:00:47	Water	50	50	1	<2
350978005	20-JUN-2014 07:00:47	Water	50	50	1	<2

Reagent/Solvent Lot ID	Description	Amount	Comments:
2098276	HYDROCHLORIC ACID	2.5 mL	Block Temperature: 93 C
2110352	Concentrated Nitric Acid	1 mL	Thermometer ID: 89095-622
			Hot Block ID: 11

General Chem Analysis

Case Narrative

**General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG X0058**

Method/Analysis Information

Product:	Ion Chromatography	
Analytical Batch:	1397186	Method: 9056_ANIONS_IC: COMMON and COMMON (Add-on)

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
350978002	B2WVV0
350978004	B2WVV3
350978006	B2WVV6
1203112308	Method Blank (MB)
1203112309	350978006(B2WVV6) Sample Duplicate (DUP)
1203112310	350978006(B2WVV6) Post Spike (PS)
1203112311	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 22.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 350978006 (B2WVV6).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

Samples 1203112309 (B2WVV6), 1203112310 (B2WVV6) and 350978006 (B2WVV6) were initially analyzed within holding; however, the holding times had expired prior to reanalysis of diluted samples.

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1203112309 (B2WVV6), 1203112310 (B2WVV6), 350978002 (B2WVV0), 350978004 (B2WVV3) and 350978006 (B2WVV6).

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1306777. 1203112309 (B2WVV6), 1203112310 (B2WVV6) and 350978006 (B2WVV6).

Manual Integrations

Manual integrations were not required for the samples in this SDG.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: n-Hexane Extractable Material

Analytical Batch: 1398438

Method: EPA 1664A n-Hexane Extractable Material (Oil and Grease)

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 1664A/1664B:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203115401	Method Blank (MB)
1203115406	350978003(B2WVV2) Matrix Spike (MS)
1203115407	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-094 REV# 13.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Oil & Grease analysis was performed on a Sartorius Balance BAL745. Oil and Grease lab

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 350978003 (B2WVV2).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

Samples 1203115406 (B2WVV2), 350978001 (B2WVT9), 350978003 (B2WVV2) and 350978005 (B2WVV5) were not preserved to a pH <2. The pH was adjusted by the analyst prior to analysis and the Project Manager was notified.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Sample Aliquot

Per EPA methodology, the entire sample was used for the analysis.

Miscellaneous Information**Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1309909, 1203115406 (B2WVV2), 350978001 (B2WVT9), 350978003 (B2WVV2) and 350978005 (B2WVV5).

Additional Comments

The client provided volume less than 1 L for the oil and grease analysis. All of the volume must be used in the extraction process; since the provided volume is less than 1 L, the resulting reporting and detection limits are elevated. 350978001 (B2WVT9). The client provided volume in excess of 1 L for the oil and grease analysis. All of the volume must be used in the extraction process, thus resulting in a lower reporting and detection limit. 1203115406 (B2WVV2), 350978003 (B2WVV2) and 350978005 (B2WVV5).

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be

scanned and inserted into the electronic package.

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1399416 and 1399451 **Method:** SM 2320B Total Alkalinity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SM 2320B:

Sample ID	Client ID
350978001	B2WVT9
350978003	B2WVV2
350978005	B2WVV5
1203117788	Method Blank (MB)
1203117790	350978005(B2WVV5) Sample Duplicate (DUP)
1203117792	350978005(B2WVV5) Matrix Spike (MS)
1203117794	Laboratory Control Sample (LCS)
1203117903	Method Blank (MB)
1203117905	350978003(B2WVV2) Sample Duplicate (DUP)
1203117910	350978003(B2WVV2) Matrix Spike (MS)
1203117915	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 11.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Titration and Ion analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 350978005 (B2WVV5)- Batch 1399416 and 350978003 (B2WVV2)- Batch 1399451.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Additional Comments

50mL of the sample was used due to limited sample quantity . 1203117790 (B2WVV5), 1203117792 (B2WVV5) and 350978005 (B2WVV5)- Batch 1399416. 50mL of the sample was used due to limited sample quantity. 1203117905 (B2WVV2), 1203117910 (B2WVV2) and 350978003 (B2WVV2)- Batch 1399451.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

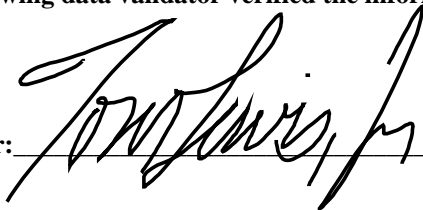
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:



Date:

03July14

DATA EXCEPTION REPORT

Mo.Day Yr. 20-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Liquid	Client Code: WCHN
Batch ID: 1397186	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350978(X0058) Application Issues: Failed Recovery for MS/PS Sample Analyzed out of Holding			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/PS: QC 1203112310PS 2. Sample Analyzed out of Holding: 350978 006 QC 1203112309DUP, 1203112310PS		1. The MS/PS mixture contains seven anions of interest. Of those, all requested anions except sulfate met normal acceptance criteria for recovery (90 - 110%). This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported. 2. Samples were not scanned to batch prior to initial run. However, samples were in the custody of analyst during analysis.	

Originator's Name:

Dustin Miller 20-JUN-14

Data Validator/Group Leader:

Thomas Lewis 03-JUL-14

DATA EXCEPTION REPORT

Mo.Day Yr. 30-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: BALANCE	Test / Method: EPA 1664A/1664B	Matrix Type: Liquid	Client Code: CORH, LATA, PNTX, STOL,
Batch ID: 1398438	Sample Numbers: 350978001, 350978003, 350978005, 1203115406		
Potentially affected work order(s)(SDG): 350767,350780,350978(X0058),350995 Application Issues: Failed Recovery for MS/PS Sample improperly preserved			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/PS: QC 1203115402MS 2. Sample improperly preserved 350978001, 350978003, 350978005, 1203115406		1. The MS falls outside the established acceptance limits for South Carolina samples due to matrix interference; however, the sample does fall within the established acceptance limits for non South Carolina samples. 2. Samples were not preserved to a pH <2. The pH was adjusted by the analyst prior to analysis and the Project Manager was notified.	

Originator's Name:

John Thomas 30-JUN-14

Data Validator/Group Leader:

Kristen Parson 30-JUN-14

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0058 GEL Work Order: 350978 Project: RC-236A Groundwater

The Qualifiers in this report are defined as follows:

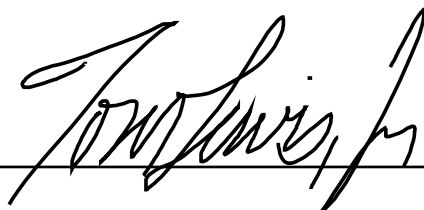
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by



GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVT9
Sample ID: 350978001
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Oil & Grease Analysis											
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"											
Oil and Grease	B	1.46	1.46	5.21	mg/L		JXT1	06/25/14	0816	1398438	1
Titration and Ion Analysis											
SM 2320B Total Alkalinity "As Received"											
Alkalinity, Total as CaCO ₃		171	0.725	1.00	mg/L		PXO1	06/28/14	1400	1399416	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1664A/1664B	
2	SM 2320B	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV0
Sample ID: 350978002
Matrix: WATER
Collect Date: 17-JUN-14 14:34
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC: COMMON, COMMON (Add-on) "As Received"											
Bromide	B	0.222	0.067	0.250	mg/L	1	DM	06/19/14	1153	1397186	1
Fluoride	B	0.267	0.033	0.500	mg/L	1					
Nitrite-N	U	0.038	0.038	0.100	mg/L	1					
O-Phosphate as P	U	0.067	0.067	0.500	mg/L	1					
Chloride	D	60.3	1.34	4.00	mg/L	20	DM	06/19/14	1427	1397186	2
Nitrate-N	D	18.4	0.660	2.00	mg/L	20					
Sulfate	D	159	2.66	8.00	mg/L	20					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV2
Sample ID: 350978003
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Oil & Grease Analysis											
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"											
Oil and Grease	U	1.37	1.37	4.90	mg/L		JXT1	06/25/14	0816	1398438	1
Titration and Ion Analysis											
SM 2320B Total Alkalinity "As Received"											
Alkalinity, Total as CaCO ₃		295	1.45	2.00	mg/L		PXO1	06/28/14	1712	1399451	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1664A/1664B	
2	SM 2320B	

Notes:

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV3
Sample ID: 350978004
Matrix: WATER
Collect Date: 17-JUN-14 12:18
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC: COMMON, COMMON (Add-on) "As Received"											
Bromide		0.266	0.067	0.250	mg/L	1	DM	06/19/14	1223	1397186	1
Fluoride	B	0.143	0.033	0.500	mg/L	1					
Nitrite-N	B	0.0598	0.038	0.100	mg/L	1					
O-Phosphate as P	U	0.067	0.067	0.500	mg/L	1					
Chloride	D	27.4	0.670	2.00	mg/L	10	DM	06/19/14	1458	1397186	2
Nitrate-N	D	19.4	0.330	1.00	mg/L	10					
Sulfate	D	145	1.33	4.00	mg/L	10					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV5
Sample ID: 350978005
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Oil & Grease Analysis											
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"											
Oil and Grease	B	1.37	1.37	4.88	mg/L		JXT1	06/25/14	0816	1398438	1
Titration and Ion Analysis											
SM 2320B Total Alkalinity "As Received"											
Alkalinity, Total as CaCO ₃		334	1.45	2.00	mg/L		PXO1	06/28/14	1403	1399416	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1664A/1664B	
2	SM 2320B	

Notes:

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Certificate of Analysis

Report Date: July 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-236A Groundwater

Client SDG: X0058

Client Sample ID: B2WVV6
Sample ID: 350978006
Matrix: WATER
Collect Date: 17-JUN-14 13:36
Receive Date: 19-JUN-14
Collector: Client

Project: WCHN RC-236A
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC: COMMON, COMMON (Add-on) "As Received"											
Bromide		0.355	0.067	0.250	mg/L	1	DM	06/19/14	1254	1397186	1
Fluoride	B	0.0999	0.033	0.500	mg/L	1					
Nitrite-N	U	0.038	0.038	0.100	mg/L	1					
O-Phosphate as P	U	0.067	0.067	0.500	mg/L	1					
Chloride	D	37.7	0.670	2.00	mg/L	10	DM	06/19/14	1733	1397186	2
Nitrate-N	DX	19.8	0.330	1.00	mg/L	10					
Sulfate	D	131	1.33	4.00	mg/L	10					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: July 3, 2014

Page 1 of 3

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1397186										
QC1203112309	350978006	DUP									
Bromide		0.355		0.351	mg/L	1.19	^	(+/-0.250)	DM	06/19/14	13:25
Chloride	D	37.7	D	38.0	mg/L	0.647		(0%-20%)		06/19/14	18:04
Fluoride	B	0.0999	B	0.112	mg/L	11.2	^	(+/-0.500)		06/19/14	13:25
Nitrate-N	DX	19.8	DX	19.6	mg/L	0.584		(0%-20%)		06/19/14	18:04
Nitrite-N	U	0.038	U	0.038	mg/L	N/A				06/19/14	13:25
O-Phosphate as P	U	0.067	U	0.067	mg/L	N/A					
Sulfate	D	131	D	131	mg/L	0.252		(0%-20%)		06/19/14	18:04
QC1203112311	LCS										
Bromide	1.25			1.24	mg/L			99.3 (90%-110%)		06/19/14	15:59
Chloride	5.00			4.88	mg/L			97.7 (90%-110%)			
Fluoride	2.50			2.46	mg/L			98.6 (90%-110%)			
Nitrate-N	2.50			2.47	mg/L			98.8 (90%-110%)			
Nitrite-N	2.50			2.51	mg/L			100 (90%-110%)			
O-Phosphate as P	1.25			1.18	mg/L			94.5 (90%-110%)			
Sulfate	10.0			9.94	mg/L			99.4 (90%-110%)			
QC1203112308	MB										
Bromide			U	0.067	mg/L					06/19/14	15:29
Chloride			U	0.067	mg/L						
Fluoride			U	0.033	mg/L						
Nitrate-N			U	0.033	mg/L						
Nitrite-N			U	0.038	mg/L						

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1397186										
O-Phosphate as P			U	0.067	mg/L				DM	06/19/14	15:29
Sulfate			U	0.133	mg/L						
QC1203112310	350978006	PS									
Bromide	1.25		0.355	1.63	mg/L		102	(90%-110%)		06/19/14	13:56
Chloride	5.00	D	3.77	D	9.25	mg/L		110	(90%-110%)	06/19/14	18:35
Fluoride	2.50	B	0.0999	2.59	mg/L		99.5	(90%-110%)		06/19/14	13:56
Nitrate-N	2.50	DX	1.98	DX	4.70	mg/L		109	(90%-110%)	06/19/14	18:35
Nitrite-N	2.50	U	0.00	2.56	mg/L		102	(90%-110%)		06/19/14	13:56
O-Phosphate as P	1.25	U	0.00	1.15	mg/L		92.4	(90%-110%)			
Sulfate	10.0	D	13.1	D	24.2	mg/L		111 *	(90%-110%)	06/19/14	18:35
Oil & Grease Analysis											
Batch	1398438										
QC1203115407	LCS										
Oil and Grease	40.0			36.2	mg/L		90.5	(73%-112%)	JXT1	06/25/14	08:16
QC1203115401	MB										
Oil and Grease			U	1.40	mg/L					06/25/14	08:16
QC1203115406	350978003	MS									
Oil and Grease	37.6	U	1.37	32.6	mg/L		83.6	(51%-105%)		06/25/14	08:16
Titration and Ion Analysis											
Batch	1399416										
QC1203117790	350978005	DUP									
Alkalinity, Total as CaCO3			334	340	mg/L	1.83		(0%-20%)	PXO1	06/28/14	14:10
QC1203117794	LCS										
Alkalinity, Total as CaCO3	50.0			49.8	mg/L		99.7	(90%-110%)		06/28/14	12:18
QC1203117788	MB										
Alkalinity, Total as CaCO3			U	0.725	mg/L					06/28/14	12:18
QC1203117792	350978005	MS									
Alkalinity, Total as CaCO3	100		334	435	mg/L		101	(80%-120%)		06/28/14	14:20

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QC Summary

Workorder: 350978

Client SDG: X0058

Project Description: RC-236A Groundwater

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1399451										
QC1203117905	350978003	DUP									
Alkalinity, Total as CaCO3		295		288	mg/L	2.47		(0%-20%)	PX01	06/28/14	17:17
QC1203117915	LCS										
Alkalinity, Total as CaCO3	50.0			50.3	mg/L		101	(90%-110%)		06/28/14	16:36
QC1203117903	MB										
Alkalinity, Total as CaCO3			U	0.725	mg/L					06/28/14	16:36
QC1203117910	350978003	MS									
Alkalinity, Total as CaCO3	100	295		381	mg/L		86.3	(80%-120%)		06/28/14	17:23

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.